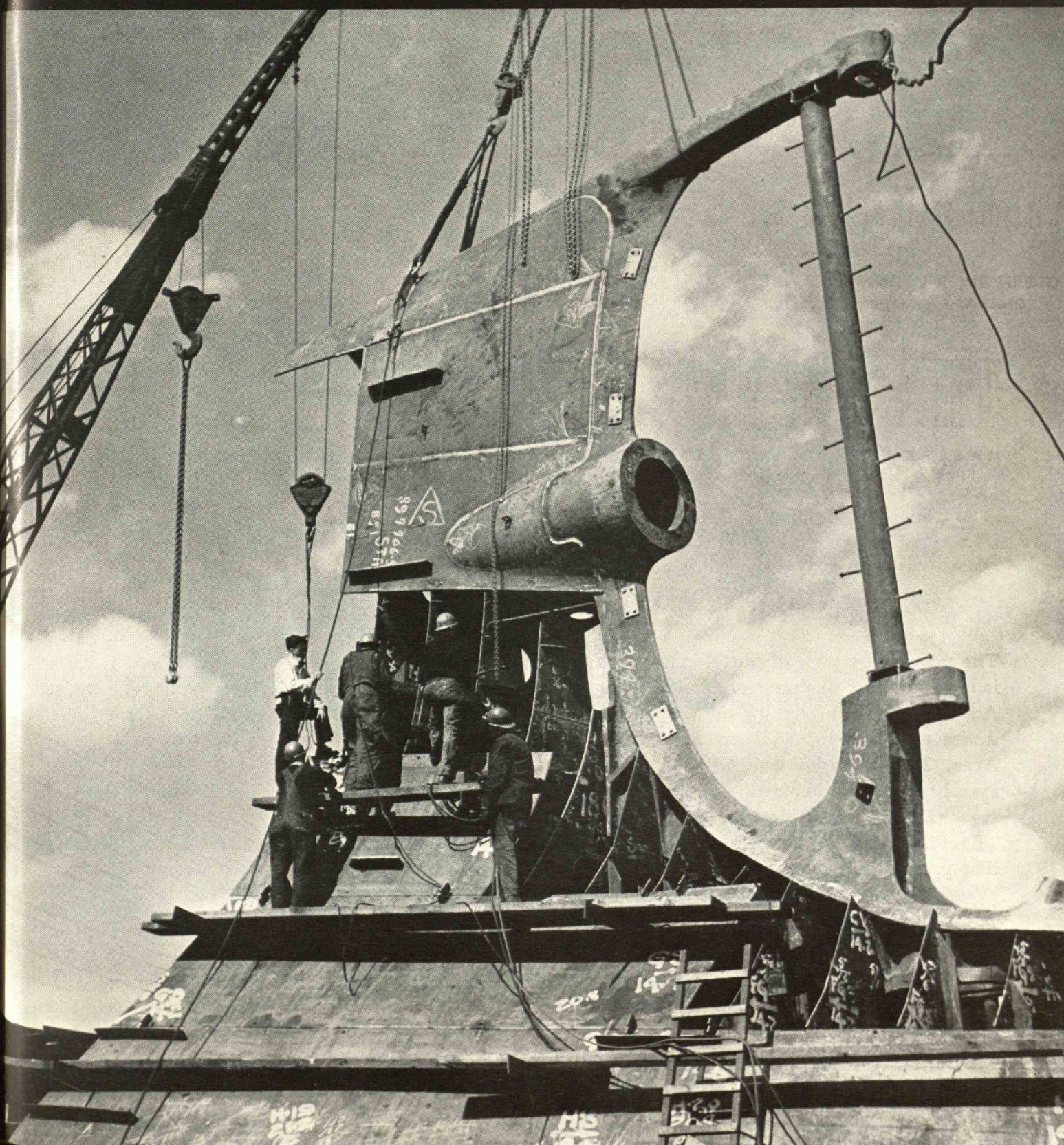


March 1945

# TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office





# technology review

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## *Placement Bureau*

The primary purpose of the Placement Bureau is to assist those members of the M.I.T. Alumni Association who on leaving the armed services, desire to return to, or locate in the Chicago Area. This likewise holds true for civilian members of the Alumni who for various reasons have been dislocated due to the war. The Placement Bureau at the Institute states that present and post war demands for tech-

nical personnel are very large. Our local Placement Bureau will work in cooperation with the Institute Bureau and will have on file requests for personnel in the Chicago area. Therefore, all Alumni members who are interested are cordially invited to write a member of the committee herewith announced, giving their class, course, experience and classification of employment desired.

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**THE HARVEY METAL CORPORATION**

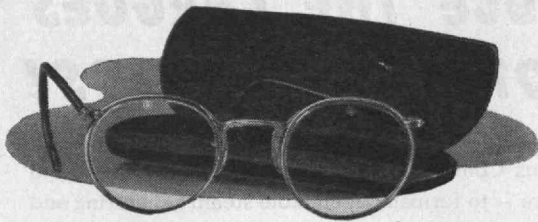
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## **A SPECK OF STEEL LODGED IN AN EYE . . . CAN COST MORE THAN A DIAMOND**




Valueless in itself, this speck of steel became costly in the split second it took to cause an eye accident. The final bill was \$343.00.\*

An adequate eye-protection program demands a place in every *cost reduction* program. And, because

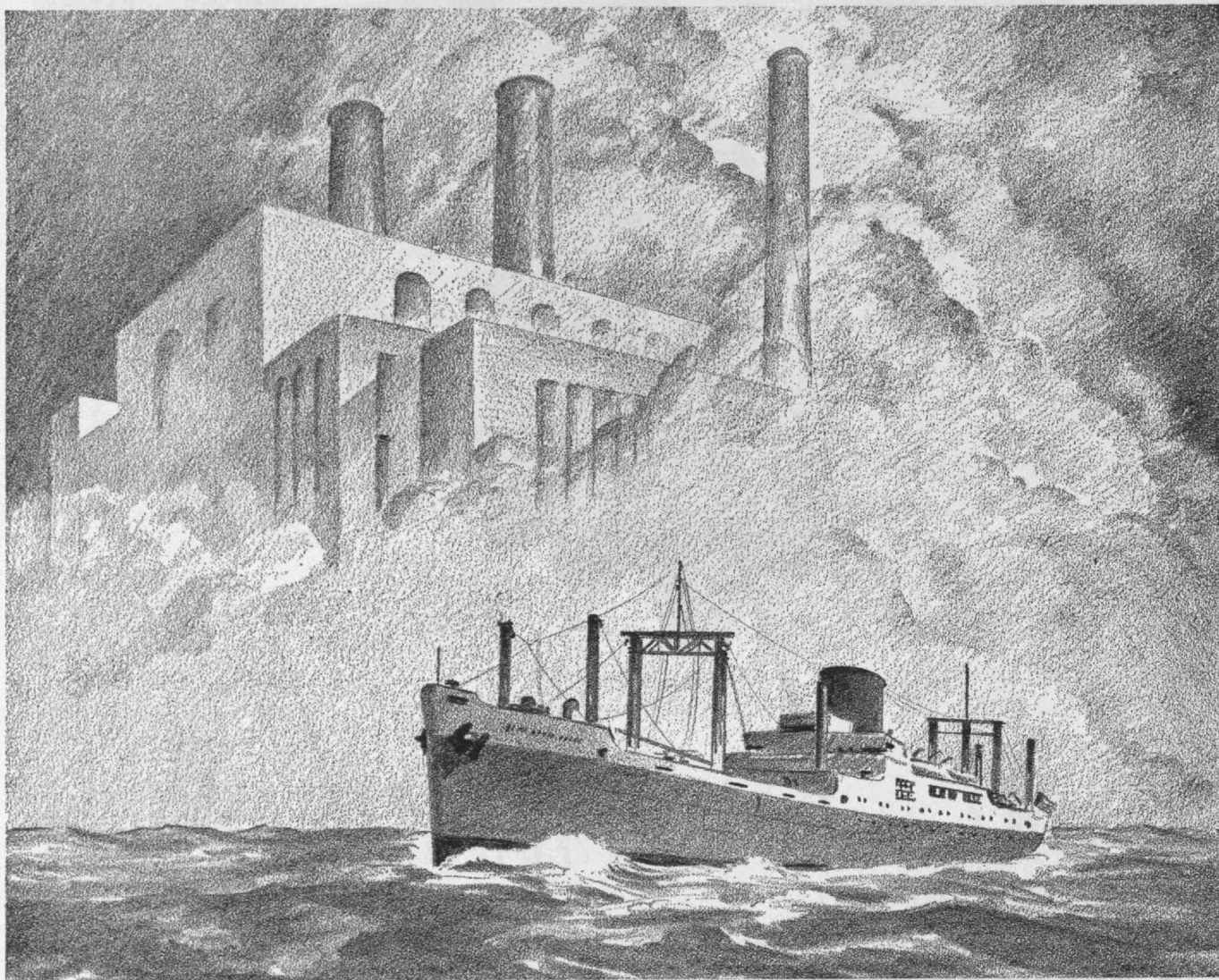
American Optical Safety Goggles are light, cool, comfortable and easy-to-wear, their protection is now readily accepted by workers in every field of industry.

Ask your Safety Director to consult with an A. O. Safety Representative. There is an American Optical Branch Office in every large industrial center.

\*Average cost of compensation and medical treatment for eye accidents, according to insurance company figures.

  
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COMPANY  
SOUTHBRIDGE, MASSACHUSETTS





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In the great shipbuilding program that's devoted to the transport of American troops and American goods to every corner of the globe, steam generating equipment built by Combustion Engineering is taking a conspicuous part. For a substantial percentage of all the boilers for the ships in the U. S. Maritime Commission's vast program are being supplied by Combustion Engineering.

On the home front where thousands of industrial plants are making the supplies that will fill these vessels, an enormous volume of production relies on power supplied by C-E Boilers, which range in capacity from small stoker-fired units of less than 50 horsepower to the largest boilers ever built.

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That's the big point about small, universal-motor problems in general. They're as alike as peas in a pod—which means they're not alike at all. They only seem alike superficially, and that's why brush problems begin to pile up.

This becomes more understandable when it is realized that a brush which works best on one make of, say, vacuum cleaner, probably won't work best on another. There are too many points of difference requiring painstaking re-

search and testing to uncover. Moreover, this work must be based on the specific application involved, with full details at hand, and backed by a COMPLETE line of brush types permitting adaptations to any one of hundreds of widely varying conditions that may be indicated.

Stackpole's facilities in this direction are entirely adequate, our record of achievement in solving small-motor brush problems is unsurpassed.

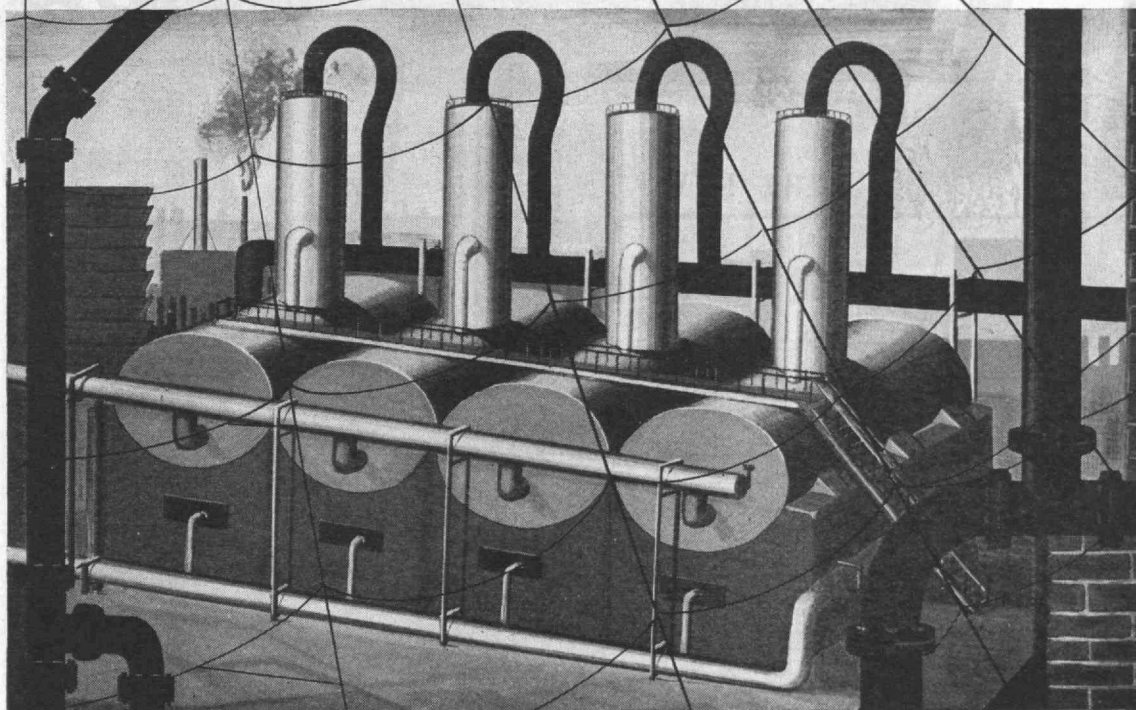
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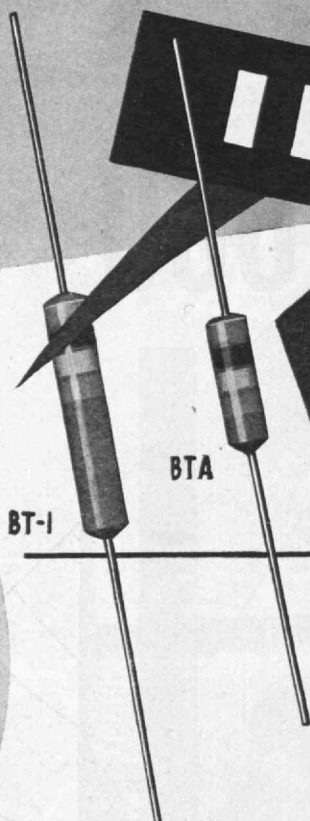
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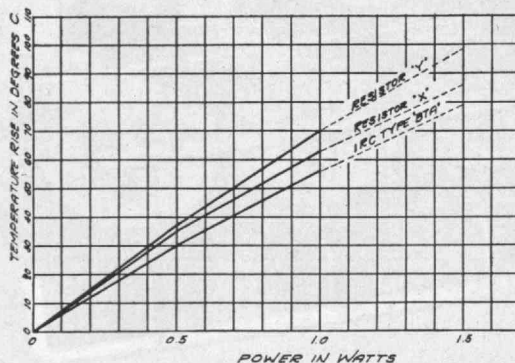
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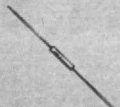
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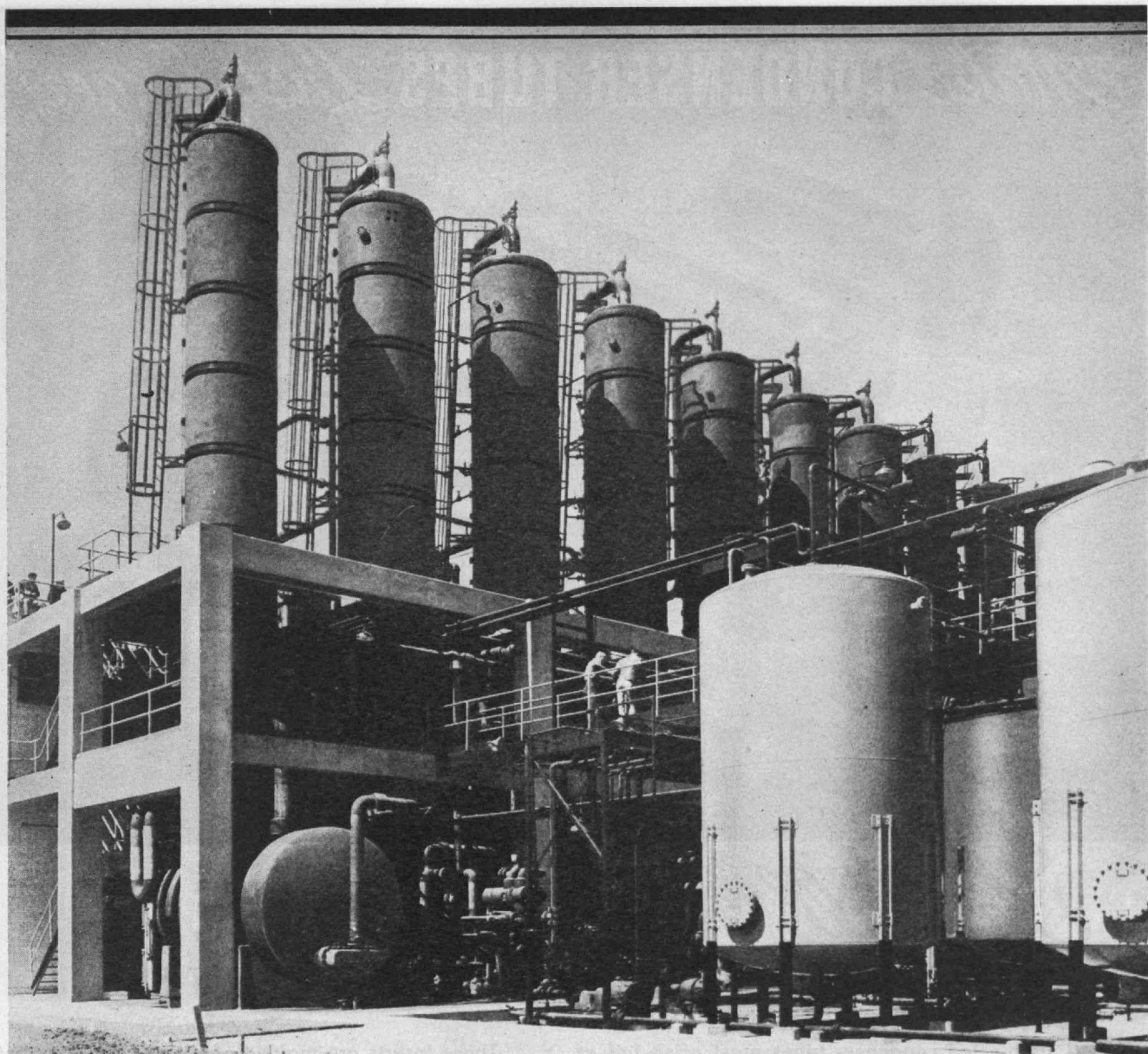
BTR—1/4 watt  
Insulated Resistor



BTA—1 watt  
Insulated Resistor

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Photograph courtesy of  
CARBIDE and CARBON CHEMICALS CORPORATION  
Most of these columns by VULCAN.

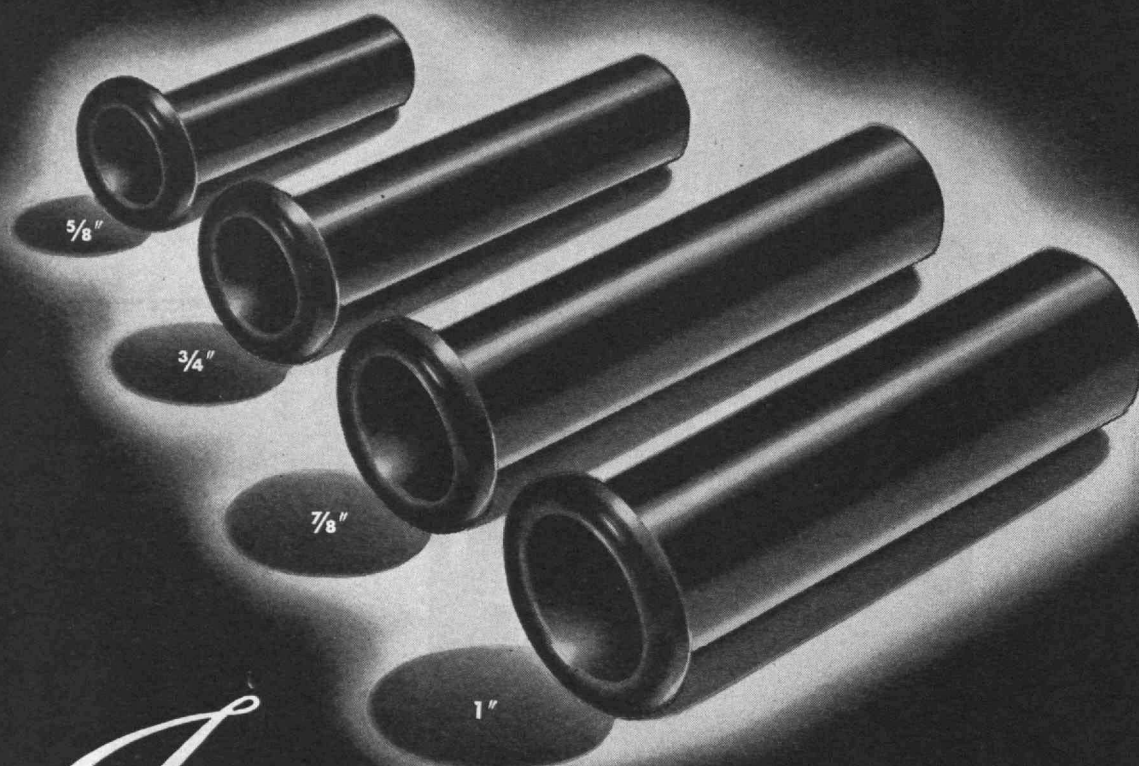
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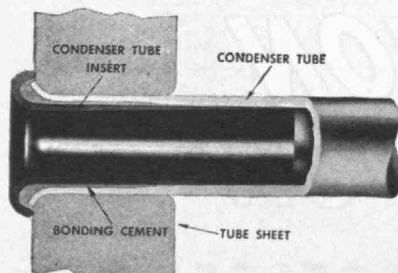
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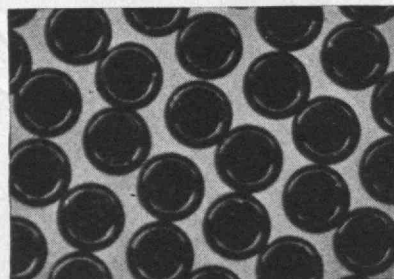


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Service tests over a long period of time show that John Crane Condenser Tube Inserts

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- Save critical metals
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Send for illustrated bulletin, or consult our branch office nearest you for full information.



Section of tube sheet with Inserts installed.

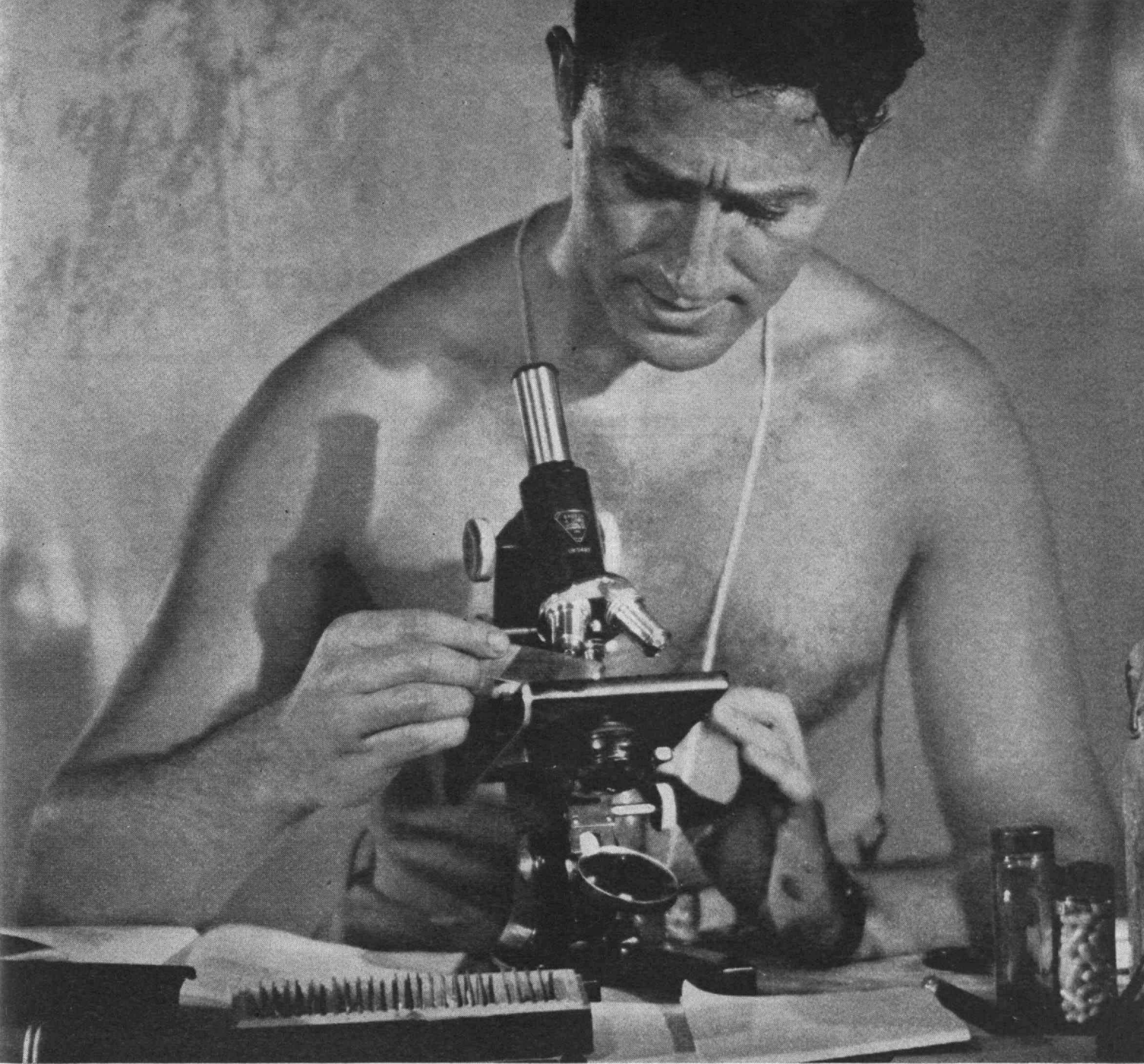
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followed in 1878 by the first mass-produced precision microscopes, two outstanding developments which were to make more and better microscopes available to all. From that day to this, Bausch & Lomb Microscopes have always represented . . . and will continue to represent . . . the latest and the best in microscope design and performance. Bausch & Lomb Optical Co., Rochester 2, New York.

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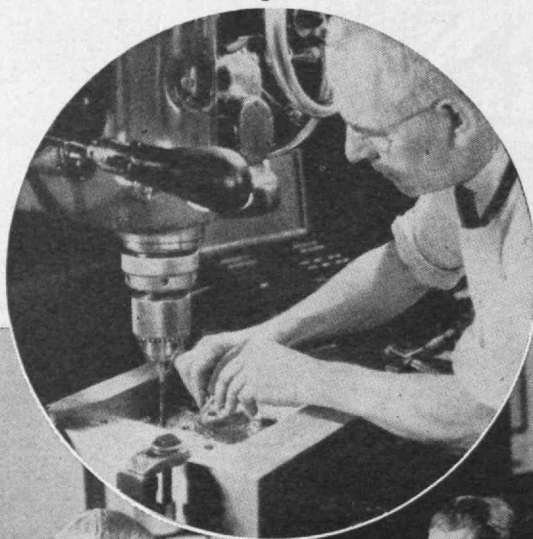




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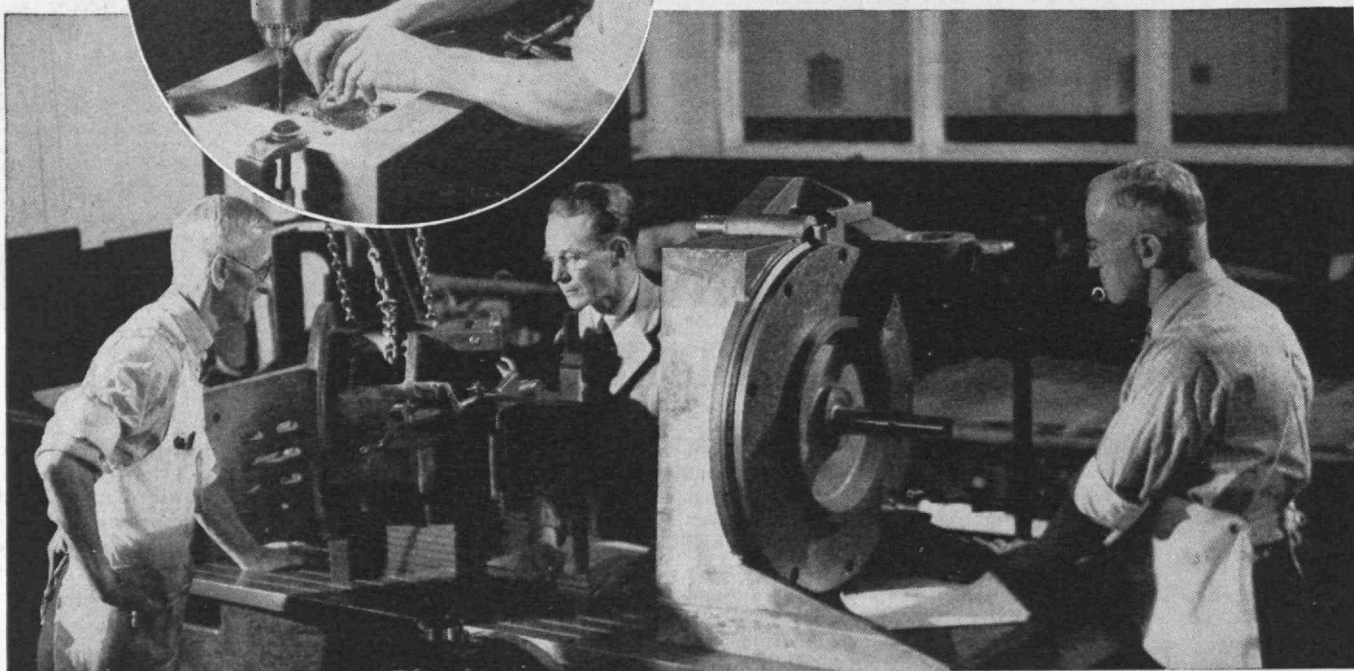
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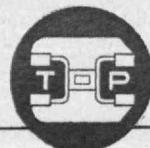
The tools you need can be produced either to your own specifications, or can be designed from scratch by Taft-Peirce engineers. And when tooling has been completed, the Taft-Peirce Contract Manufacturing Division is manned and equipped to handle your production problems, too, if this type of assistance is needed.

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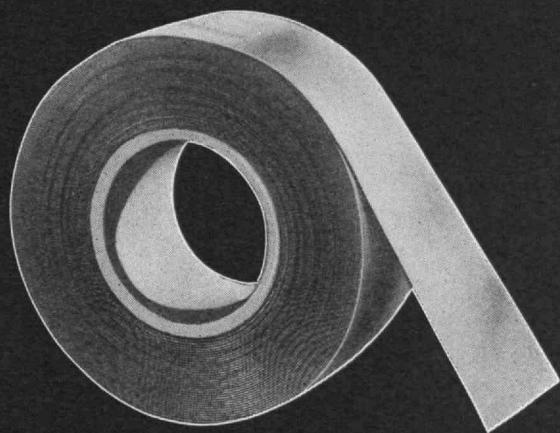
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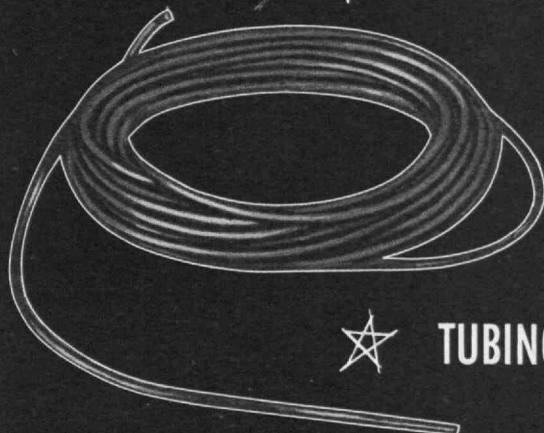
Imprinted terminal insulators and identification sleeves by Sandee have many advantages over electrical tubing of other types, — they may be stretched over terminals, are not subject to aging or weathering, and stand up equally well in cold and hot climates.

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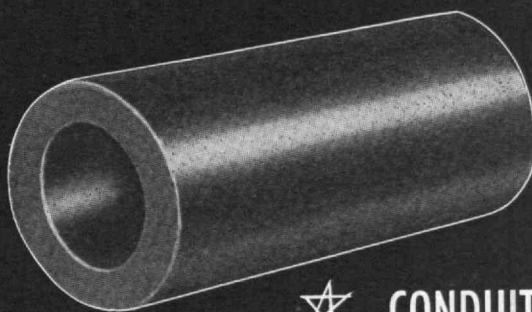
Elmer Szantay, M.E. '35  
General Manager



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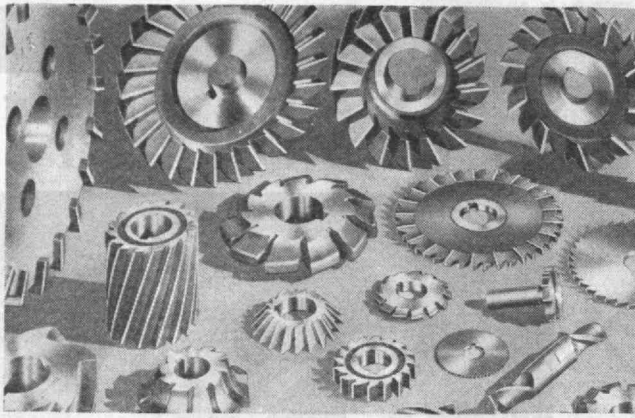
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## THE TABULAR VIEW

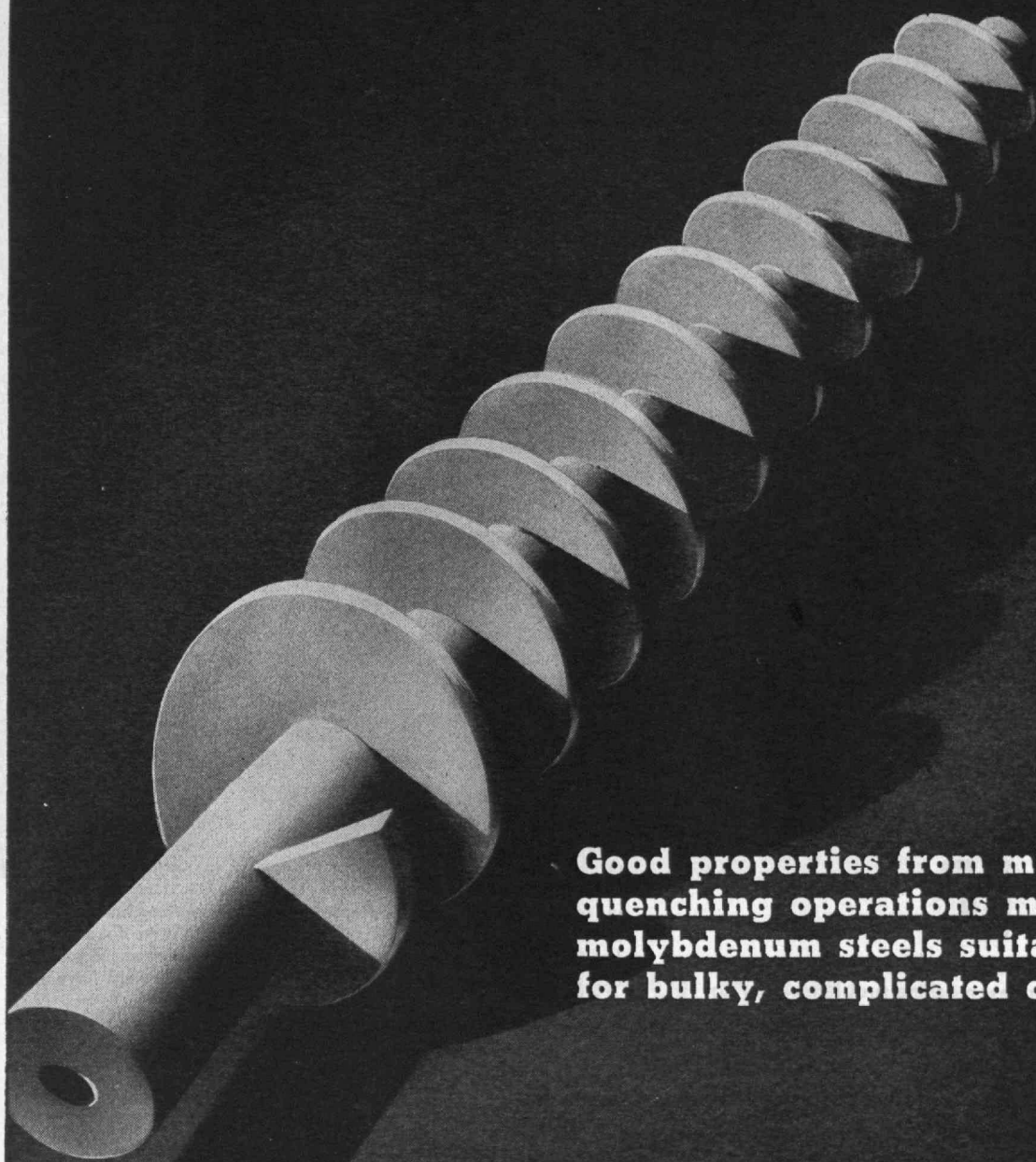
**Passage Possibilities.** — Advent of the age of air can be expected to occasion changes in peacetime patterns comparable to those which it has brought about in the patterns of warfare. One such alteration even now analyzable is the effect of air transportation upon accustomed habits of American travel to Europe. Applying statistics gathered from authoritative sources, EMMONS J. WHITCOMB in this Review (page 297) measures speculatively both the likelihood of fundamental change in conventional travel and the dependability of various predictions concerning the air fleets of the future, with interesting results. A graduate of the Institute in 1911, Mr. Whitcomb has long been connected with the travel industry, for many years with an organization whose name has been synonymous with tourist business throughout the world, subsequently as a specialist in all phases of the development of air travel, and more recently as a consultant to the Puerto Rico Development Company in the development of the tourist industry.

**In Model Mode.** — The strange lands and strange people that Lemuel Gulliver visited remain as fanciful but become less bizarre when they are viewed in the light of science. They are so examined in this issue (page 299) by MILTON B. DOBRIN, who applies to the odd world which Dean Swift imagined some of the principles of dimensional analysis which engineers use. Mr. Dobrin, a graduate of the Institute in 1936, after serving as geophysicist with the Gulf Research and Development Company joined the staff of the Naval Ordnance Laboratory where he has had much occasion to practice the methods which he brings to bear on Lilliput in his essay.

**Highwaymen Harried.** — The task of linking the Americas by roads calculated to carry a large and steady volume of traffic is rigorous enough if one considers only the geographical spans involved. But as EDWIN W. JAMES points out in this Review (page 301), it is a task complicated further by unusually difficult terrain, by the lack of facilities for the prompt handling of materials, machines, and man power, and by other demands peculiar to the various areas traversed. As chief of the Inter-American Regional Office of the United States Public Roads Administration, Mr. James, who is a member of the Institute Class of 1907, knows at first hand the problems which he discusses.

**Transmutation.** — An interesting corollary of expedited wartime manufacturing has been the application of mass-production methods in the building of airplanes. How this transmutation has been effected by one major aircraft firm is recounted for The Review (page 303) by RONALD A. WHITE, a graduate of the Institute in 1933, who is staff assistant in the manufacturing engineering division of the Lockheed Aircraft Corporation.

**Waylayers.** — From TENNEY L. DAVIS, Emeritus Professor of Organic Chemistry at the Institute and now director of research for the National Fireworks Company, The Review presents (page 294) a characteristic excursus into the history of technology which has special bearing on the present of a war-torn world. Dr. Davis, an Alumnus of the Institute in the Class of 1913, was long an editorial associate of The Review.



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quenching operations make  
molybdenum steels suitable  
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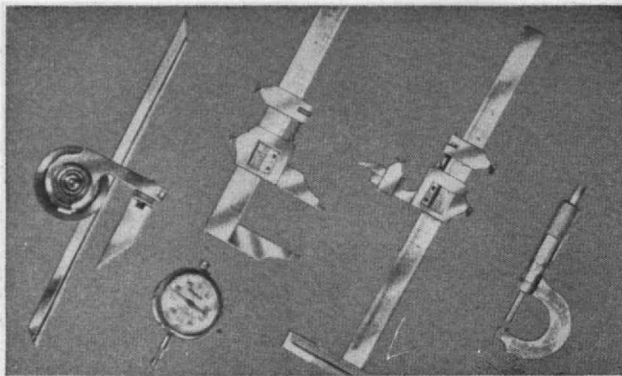
**CLIMAX FURNISHES AUTHORITATIVE ENGINEERING  
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you are looking for a firm of manufacturing engineers to work with you on a new machine problem—why not get in touch with Rodney Hunt? This firm has complete foundry, metal-working and wood-working facilities, a highly trained staff of supervising engineers and over a hundred years' experience. Rodney Hunt specialties are:

**STAINLESS STEEL TANKS** (patented construction gives extra strength per weight, reduces cost)

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## MAIL RETURNS

### "The Builders"

FROM DONALD W. SOUTHGATE, '11:

Congratulations on your use of "The Builders" by Vannevar Bush, '16, as your credo for the beginning of the 1945 issues of *The Review*. It seems to me that Dr. Bush's essay might very well become a permanent creed for the School of Architecture, for, like Shakespeare's "seven ages of man," this essay appears to describe all of the fascinating interests in the career of an architect. Certainly you have chosen an inspiring frontispiece for these significant times!  
Nashville, Tenn.

FROM HENRY R. ALDRICH, '14:

Congratulations to you and Vannevar Bush, '16, for "The Builders," to which you give feature space in the January Review. Although I am years overdue in sending a bouquet, I have always read *The Review* with great interest and satisfaction after scanning the class notes. The January number is most excellent and "The Builders" a gem. . . .  
New York, N. Y.

### Best Account

FROM PROFESSOR ROBERT P. BIGELOW:

"Heat and Acid versus Life" in *The Review* for January is the best account of respiration that I ever have seen. There are two points, however, that I should have liked to have more fully explained. To a simple-minded anatomist, it is not clear why the reactions are reversed in the lungs, and more about the role of sodium in the blood plasma would have been appreciated. I find *The Review* very interesting.  
Brookline, Mass.

### The Last Blush

FROM GERARD CHAPMAN, '36:

We (editorially) blush also for having been ignorant of the Algoma Steel Corporation's plant at the Canadian Soo. I am glad that several of your readers called me on it, for I don't like misinformation. Be it known, however, that before I wrote to you the last time about unloading ore at the Soo, I looked up a couple of references and found nothing about any steel mill there; the references apparently were not adequate. Let this be a lesson, for if I had confined myself to criticism of your picture and had not dragged in the *New York Times*, all would have been well.

Thanks anyway for an interesting exchange of letters, and be assured that I find *The Review* most informative and interesting.  
Cloquet, Minn.

**Speed with  
Economy**



*Air Reduction Sales Co.  
(Alteration and Rehabilitation)*

Will you have to alter or enlarge your plant?  
... Our organization is known for its ability to build with maximum speed and minimum interruption to plant operations.

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**INDUSTRIAL CONSTRUCTION**

Alfred T. Glassett, '20, Vice President



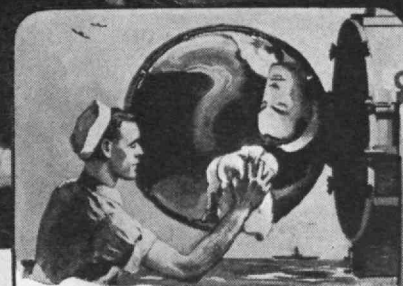
## LIGHT ON THE RISING SUN

UNCLE SAM'S NAVY has the most efficient searchlights on the Seven Seas. They are so powerful that one of them measuring 24 inches across can shoot a beam of light through 23 miles of inky darkness.

The reflectors of these searchlights are made of an alloy perfected and produced by HAYNES STELLITE COMPANY, a Unit of UCC.

The Navy is using this Haynes Stellite alloy for several reasons. It will not shatter from shock of gunfire. It has high resistance to corrosion by salt air, salt spray, powder and sulfur fumes. It withstands the terrific heat of the arc light—and hot particles of copper and carbon from the electrodes do not cause it to pit and lose its

reflectivity. Searchlight reflectors are indicative of the many applications to which Haynes Stellite alloys—with their unique combinations of properties—can bring more efficient performance.



Keeping Navy searchlight reflectors spotlessly clean is an unending job. The Haynes Stellite alloy, from which many reflectors are made, is so hard that constant cleaning and polishing will not mar its surface.




Haynes Stellite alloys have long been used for scientific mirrors, surgical and dental instruments and other equipment requiring great resistance to corrosion, wear and heat. Unending research by UCC is constantly adding to the variety of these alloys. They can be produced in many exacting shapes—in quantity—and delivered ready for assembly without further finishing.

Consulting engineers, production managers, educators and designers are invited to send for booklet P-3 describing the properties of Haynes Stellite alloys.

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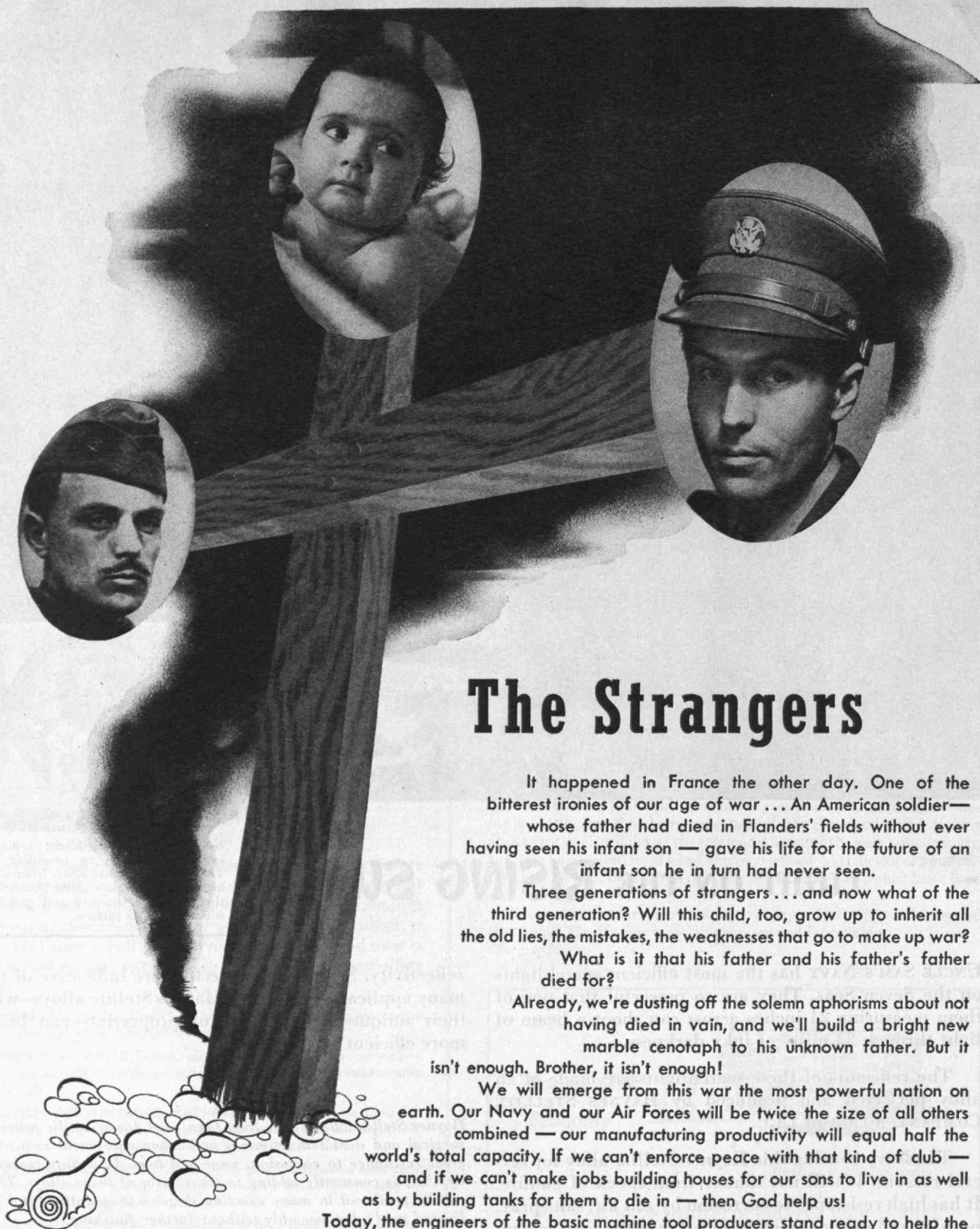
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## The Strangers

It happened in France the other day. One of the bitterest ironies of our age of war ... An American soldier—whose father had died in Flanders' fields without ever having seen his infant son—gave his life for the future of an infant son he in turn had never seen.

Three generations of strangers ... and now what of the third generation? Will this child, too, grow up to inherit all the old lies, the mistakes, the weaknesses that go to make up war?

What is it that his father and his father's father died for?

Already, we're dusting off the solemn aphorisms about not having died in vain, and we'll build a bright new marble cenotaph to his unknown father. But it isn't enough. Brother, it isn't enough!

We will emerge from this war the most powerful nation on earth. Our Navy and our Air Forces will be twice the size of all others combined—our manufacturing productivity will equal half the world's total capacity. If we can't enforce peace with that kind of club—and if we can't make jobs building houses for our sons to live in as well as by building tanks for them to die in—then God help us!

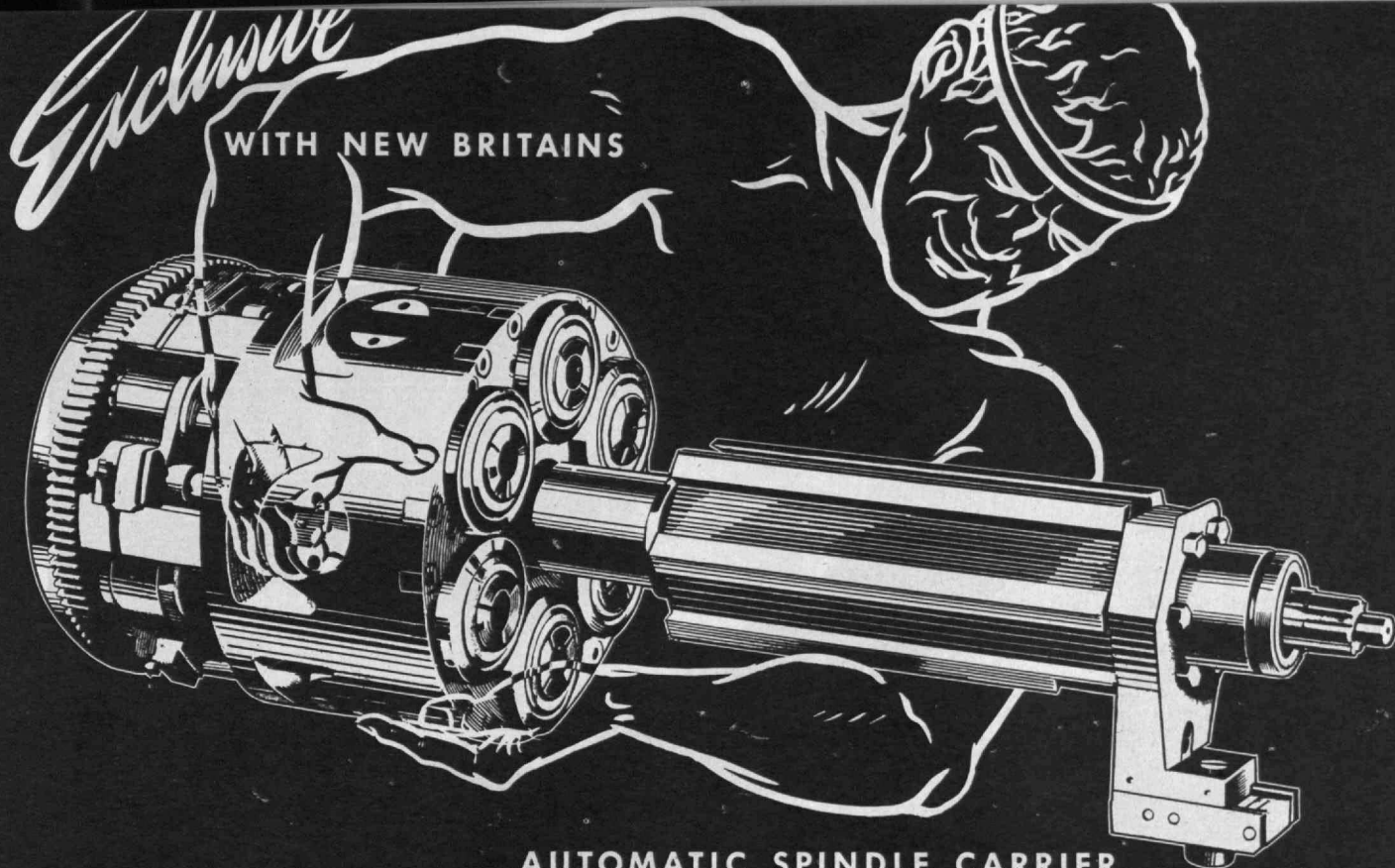
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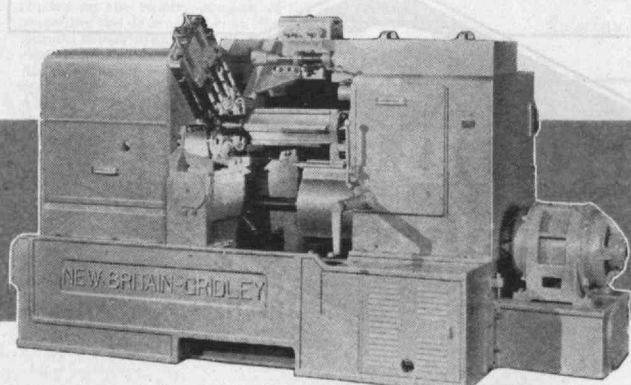
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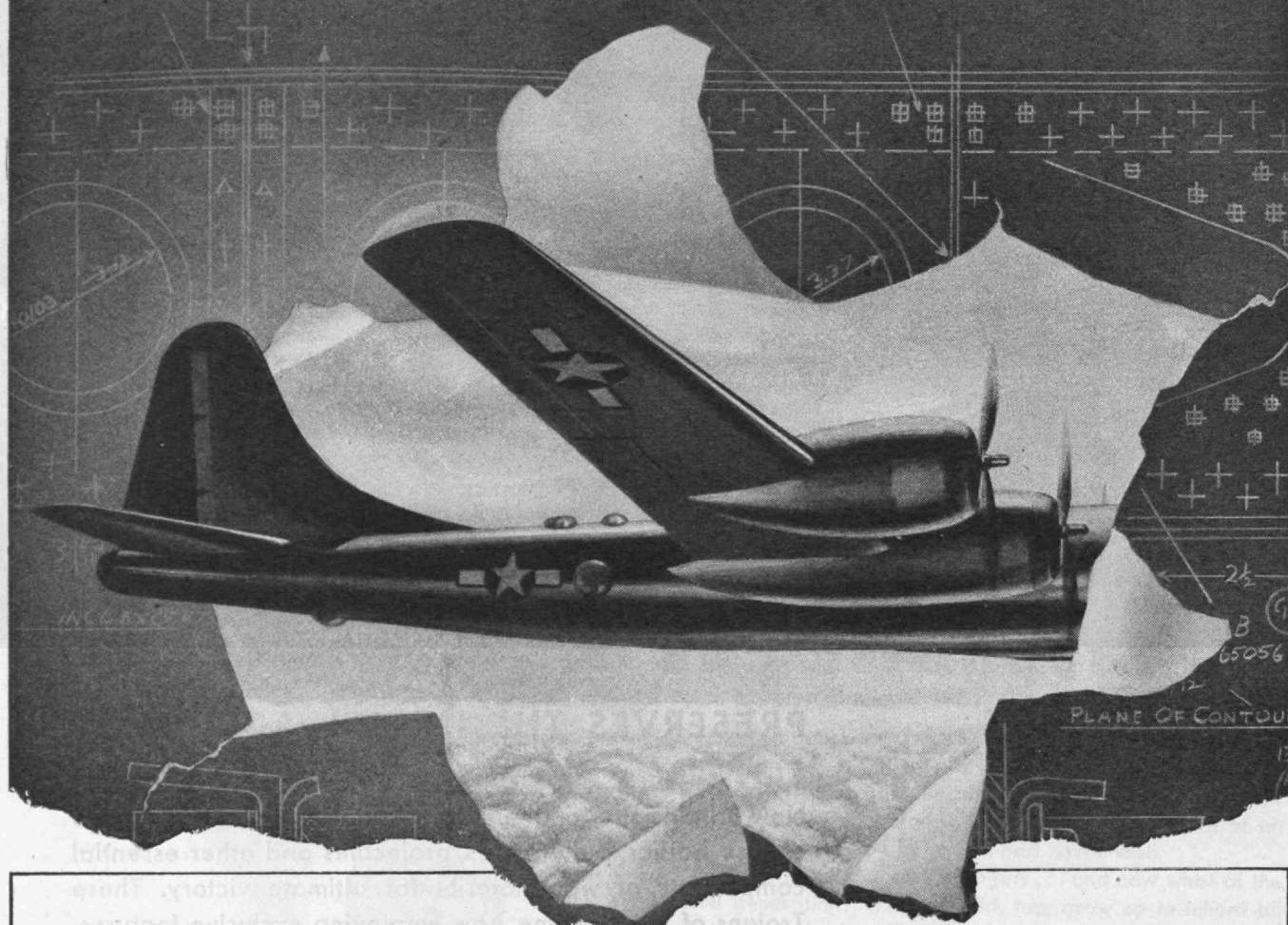
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# GOOD YEAR AIRCRAFT PRODUCTION REPORT



CONTRACT: W33-038-ACIO9

## BOEING B-29 (Superfortress)

750 SETS: FORE AND AFT BOMB BAY SECTIONS,  
WING CAP SECTIONS, EMPENNAGES

INITIAL CONTRACT RECEIVED: *AUGUST 1943*

FIRST PRODUCTION UNIT DELIVERED: *MARCH 1944*

100<sup>TH</sup> PRODUCTION UNIT DELIVERED: *NOVEMBER 1944*

REMARKS: Conversion to B-29 production was effected without interrupting completion of B-26 contract in same plant. Although change-over involved building more than 8,500 tools and schooling of hundreds of employees in B-29 processing, first units were delivered full month ahead of schedule. Orders for 30 modifications in original design led to Goodyear's development of "quick-fix" method of making these changes without stopping production line—an achievement that is speeding deliveries of these essential components.

Goodyear is building components for 16 different Army-Navy types of aircraft, including complete airships and Corsair fighters.



GOODYEAR AIRCRAFT CORPORATION, Akron, Ohio

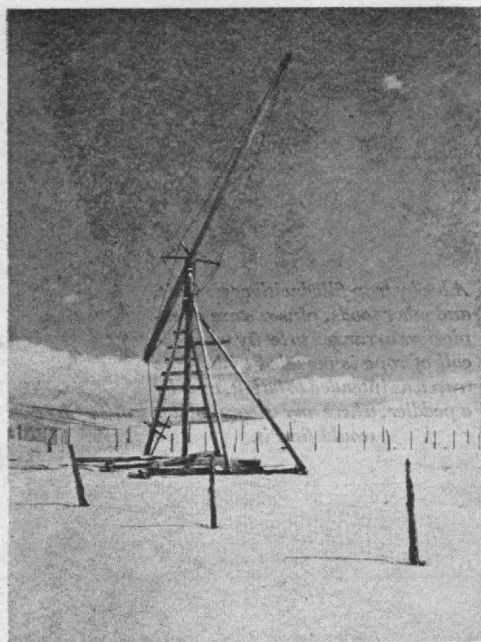
Litchfield Park, Arizona

# THE TECHNOLOGY REVIEW

TITLE REGISTERED U. S. PATENT OFFICE

EDITED

AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY



Rothstein for Farm Security Administration

*A hay stacker bides its time in the March snow in Summit County, Utah.*

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*From a photograph by Libsohn for Standard Oil Company, N. J.*

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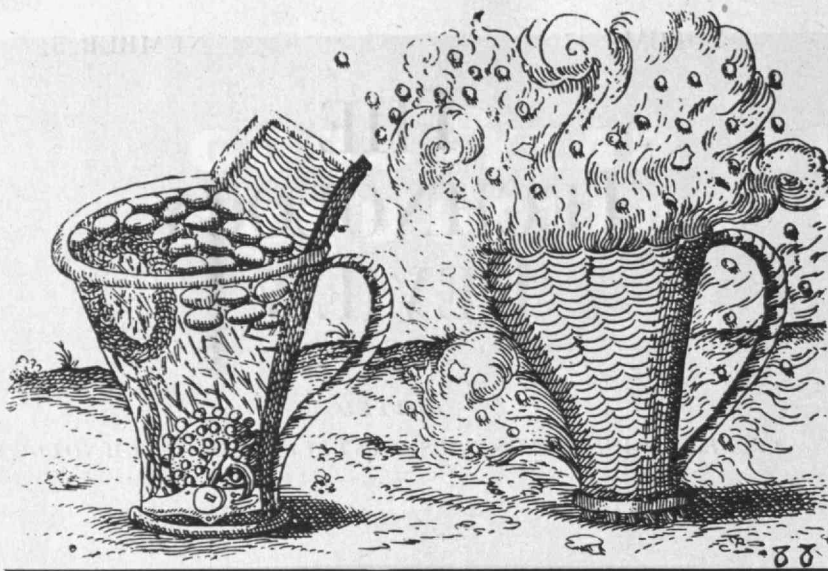
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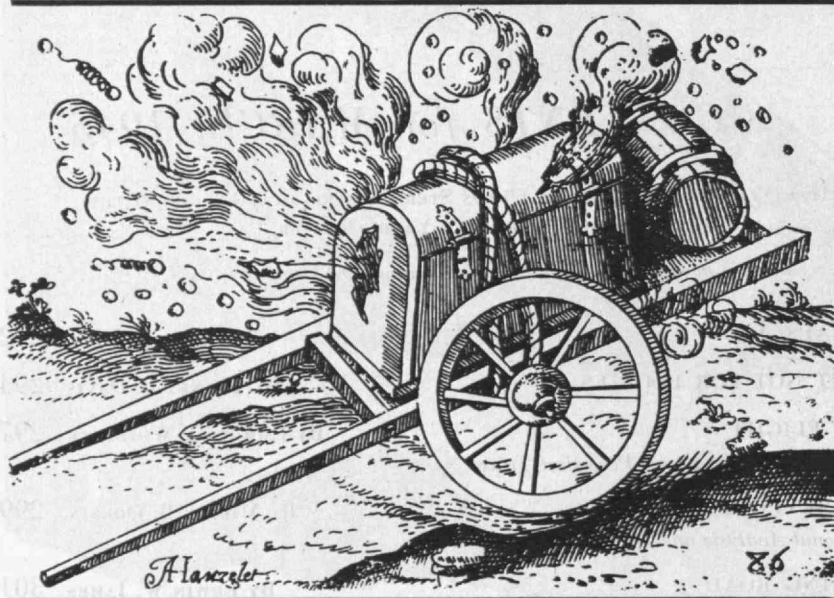
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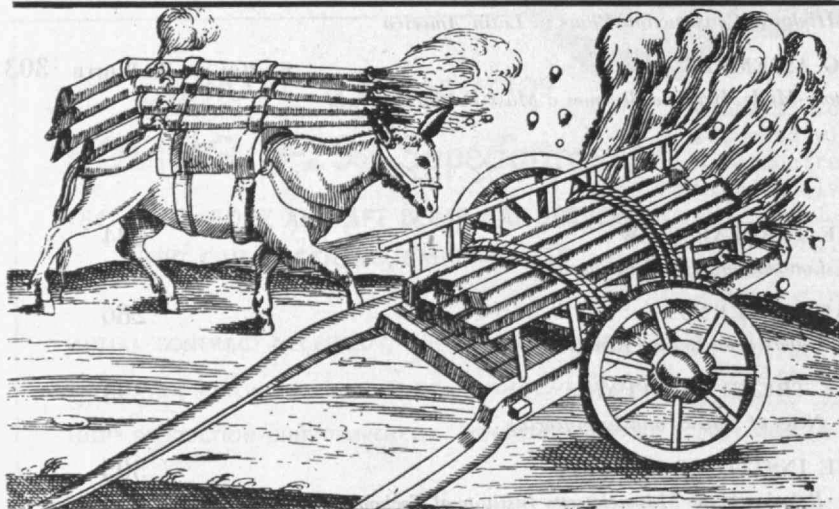




A booby trap filled with eggs, fruit, and other foods, plus a store of explosives arranged to let fly when the coil of rope is meddled with. This trap was intended to be left, as if by a peddler, where any enemy soldier would find it.



When thieving soldiers turned the key in its lock, this peddler's cart blew up. It was designed to kill or burn 20 or 30, and was recommended for attracting soldiers bent on pillage.



The Q-boat principle of camouflage and deception, applied to a donkey and to a cart. These are not booby traps since they are not fired by the person against whom they are directed.

### Booby Traps, 1630

From the *Pyrotechnie of Hanzelet Lorrain*, published at Pont-à-Mousson in 1630, come these examples of elementary military technology. They are discussed by Tenney L. Davis, '13, on page 294.

# THE TECHNOLOGY REVIEW

Vol. 47, No. 5



March, 1945

## The Trend of Affairs

### *It Stays Compressed*

**F**ROM the energetic Forest Products Laboratory of the United States Department of Agriculture at Madison, Wis., comes now a new wooden wonder — a compressed product of high specific gravity that does not spring back to its precompression dimensions when it has been wet. Known as “staypak,” the new product is made of flat-sawed nonresinous wood and veneer spread with glue, assembled in parallel-laminated or cross-banded form, and compressed under conditions that cause some flow of the lignin, the cementing material between the fibers of the wood. Densified wood — in which no flow of the lignin occurs — will lose its compression to a marked degree under conditions causing swelling. Staypak, on the contrary, although it will swell appreciably when wetted, returns to practically the original compressed thickness on drying to the original moisture content.

Higher temperatures and moisture contents are used in making staypak than are customary for related products. Pressures as high as a ton to the square inch have been used at the Forest Products Laboratory, though generally it is found that 1,400 and 1,600 pounds per square inch are sufficient to give adequate compression of yellow birch and sugar maple, respectively. A principal advantage of staypak, the laboratory points out, is that it may extend the field of utilization of some species little used at present, such as cottonwood, willow, and alder.

### *Gunning for Oil*

**W**ITH his war machine using crude oil at the rate of over a million barrels a day, Uncle Sam is doing everything he can to encourage petroleum hunters. The term “hunter” is used advisedly, since an actual gun loaded with powder and shot is fired in this pursuit. A good petroleum gun consists of a cylindrical steel tube two to 10 inches in diameter and 10 to 20 feet in length.

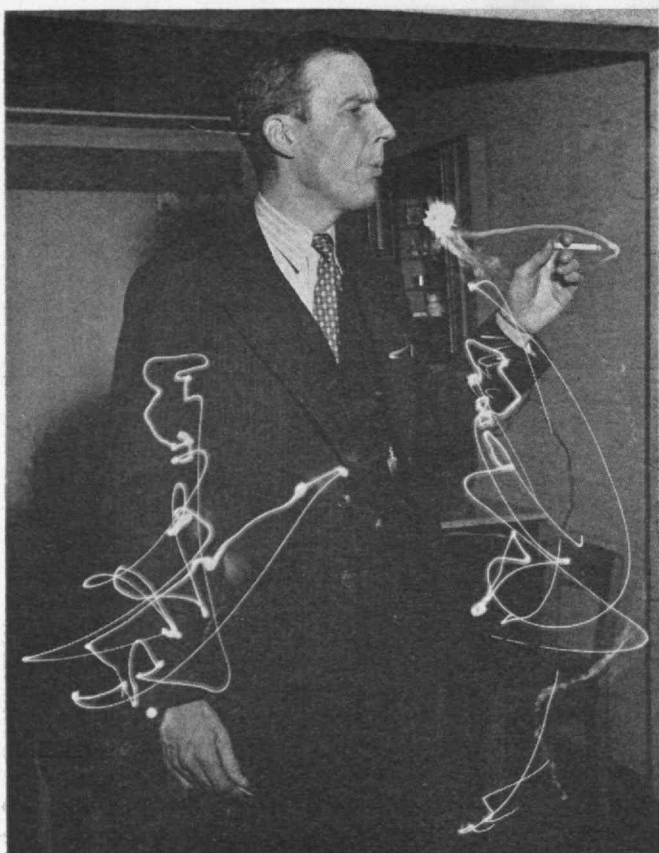
Mounted in the tube perpendicular to its axis are 30 to 50 barrels which can be fired singly or collectively. The gun is slung on the end of a steel-jacketed electric cable about three miles long. Thus it can be lowered down a hole to any predetermined depth and triggered electrically from the surface. The bullets travel radially outward, penetrate the steel casing that lines the well, and perforate or fracture the surrounding cement or rock. If oil is present, it can then flow in through these openings.

Although many new wells are brought into production by this method, gun perforating is mainly used for tapping formations that were passed by when older wells were drilled. In this way additional oil is obtained with a minimum expenditure of man power and matériel. Sometimes the upper sands are more productive than the original ones. As in all hunting, an element of luck is involved, but this has been reduced to a minimum by the scientific scouting that precedes the actual shooting.

If an electric log was run on the well before it was cased, the exact location of a promising formation may be relatively easy to determine. Many of the older wells did not have these resistivity, or self-potential, profiles taken. Likewise few of them were cored, since coring was and still is a laborious and expensive procedure. Hence in many wells the only basis for locating a particular stratum is from the often inaccurate records of the types of cuttings washed up during drilling. Once the casing has been cemented into place, the formations are hidden behind a considerable thickness of steel. Only recently has a method been developed for exploring through this barrier.

This clever technique is known as radioactive logging. It is based on the characteristically different radioactive content of the various sedimentary rocks. Shales, particularly those containing considerable organic material, are relatively high in radioactivity. Sands and limestones are generally low. The radioactivity is largely associated with uranium and thorium compounds precipitated with the other constituents of the sediments at the time of deposition. Each of these heavy elements spontaneously disin-





Acme

*Cigarette shortages at least save motion, to judge by the tracery of movement through which this smoker went in finding a match and kindling his. Lighted electric bulbs attached to his wrists registered the pattern of motion on a negative exposed in total darkness. A second exposure showing the completed action was illuminated by a flash bulb.*

tegrates and gradually establishes a whole series of other radioactive elements. Radium is the most familiar member of the uranium series.

During these atomic transformations, gamma rays are emitted, which are similar to x-rays but are even more energetic and hence easily penetrate the steel casing of the well. They can be detected and accurately measured by sensitive electrical devices such as ionization chambers or Geiger counters. In fact these instruments have been so perfected that gamma-ray logs can be obtained while the detection instrument is being moved through the well at 25 to 30 feet a minute. A continuous record or radioactive profile is plotted by a recording instrument mounted in the portable laboratory housed in a truck on the surface. From such logs and a knowledge of the subsurface geology of the region, determinations of depths as great as 15,000 feet can often be made with an uncertainty of only a few feet. The gunner then knows quite accurately where to fire his perforator with the greatest chance of hitting oil.

## Traps, But Not For Boobies

BY TENNEY L. DAVIS

**A** BOOBY is defined as a dunce, a stupid fellow, also an awkward lubberly fellow, but the definition provides no satisfactory basis for understanding what a booby trap is. Booby traps are not designed particularly for the entrapping of boobies, nor is their efficiency for that purpose any measure of their excellence. The best booby

traps indeed are designed to ensnare intelligent persons by an appeal to their curiosity and interest. The appeal must be definite. Traps into which a wayfarer blunders by accident are traps to be sure, but not booby traps. Booby traps must be of innocent appearance, showing no hint of their harmfulness, and they must be attractive or interesting, apparently desirable or useful. They are intended to be actuated by the person to whom they are intended to be injurious.

When used for purposes of war, booby traps fight for a general in places where the men of his army are absent. This is one of the ways in which explosives are now being used on the beaches of Europe, in the forests, and in the villages. Booby traps containing snakes, poisons, and so forth, were probably known to the unrelenting Romans, to the wily Greeks, and to the ingenious Chinese, and it may be that the latter made early use of booby traps loaded with gunpowder. At any rate, booby traps containing explosives were used in Europe early in the Seventeenth Century. Two such devices are described in the *Pyrotechnie* of Hanzelet Lorrain, which was published at Pont-à-Mousson in 1630.

Lorrain was able by means of a wheel lock to produce fire almost instantly and at the slightest touch. The device consisted of a toothed wheel of steel, wound up against the tension of a spring and held wound by means of a ratchet. When a pull on a trigger or on a string released the ratchet, the wheel started to rotate rapidly, striking its teeth against a piece of flint and producing a stream of sparks for the ignition of gunpowder. It probably worked as well as a modern cigar lighter.

Lorrain describes his first booby trap as:

"Another invention of an instrument which when used rightly can make a disagreeable job for an enemy.

"Since a common osier basket such as everyone uses can be carried anywhere without suspicion, take two wooden bowls plenty strong and thick which fit closely one within the other; bind them with good iron wire well tightened in many places; then attach and fasten very near to them a harquebus wheel lock, and make a hole in one of the bowls at the position of the pan of the said wheel lock to serve as a passageway to the primer; you will make a hole on the top of the said bowls to fill them with good powder, then you will plug up the hole; and afterwards take some black pitch, a little turpentine, and some sifted cement from which you will make a paste with which you will cover the said bowls to the thickness of half a finger, and in the said paste while it is still hot you will set a good quantity of harquebus balls, and you will tie an end of match cord to the ratchet of the said wheel lock: this done you will bind your wheel lock and set the dog on the primer and tie it to the bottom of the said basket in such manner that it does not move. The cord will be made into a coil which you will set in the said basket, and one of its ends will be attached to the ratchet of the wheel lock; and the rest you will fill up with eggs, fruit, and other foods. And when the person who wishes to steal the said coil will seize it, he will release the ratchet, and the fire will take hold with marvelous assault upon those who are near by. The thing can be brought by the food peddlers to the troops of the enemy when they bring food to them."

The second one, TB Mk 2-30, Trap, booby, Mark 2, model of 1630, is described as a "chest of fireworks." It appears to have been invented to meet a particular

situation and to have been used in it to good purpose. One suspects that Lorrain may perhaps have built it for a peddler friend.

"How necessity makes means to be found to avenge oneself on one's enemies. A French merchant was accustomed to peddle his goods among the troops as much from the side of the open forts as from other places, and as there were garrisons at all of the strong points, some of the one side, some of the other, which laid a toll upon all who passed, this merchant was robbed from three or four directions at once and suffered great losses both in merchandise and in the ransoms which he was constrained to pay. Seeing himself stripped of all livelihood and as in despair, complaining to a friend of his, he asked him what means he could find to be avenged on those who had thus ruined him. The invention was suggested to him to fix up a cart similar to that with which he was accustomed to peddle his merchandise; equipping it with a chest similar to that in which he carried bolts of silk, and in place of the said cloth the chest should be filled with fire barrels, grenades, fire pots, powder, and other fireworks; and to announce the time of a fair where he was accustomed to go in order to bring the said cart near the places where he had been robbed. Soon the said cart was built and the chest accommodated to it within which there was placed a charge of grenades, fire barrels, fireballs, and a good quantity of powder. After the whole was well set up, he caused wheel locks made especially for the purpose to be fixed within the said box, one worked from the lock which connected with the key of the chest and released the ratchet when it was opened, the other was attached in another place within the said chest and its ratchet was released as soon as one lifted the cloth which covered whatever was packaged in the form of bolts of silk. The said cart was brought to the accustomed place and there it was taken and seized just as the others had been. The soldiers wishing to take the booty and opening the said chest, they were either killed or burned to the number of 20 or 30. This invention

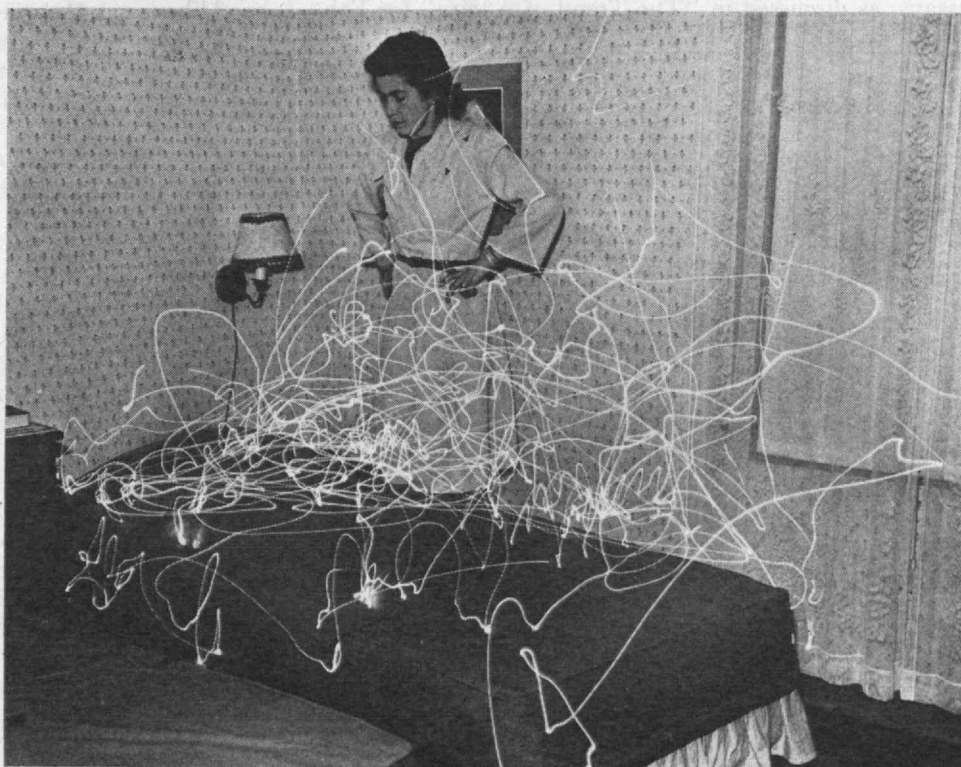
can serve in some ambuscade to attract an enemy which has given itself over to pillaging and not to fighting."

Among the many military and pyrotechnic contrivances which Lorrain describes there is one other which comes close to being a booby trap but which fails to conform to the definition because it is actuated by a soldier who wishes to injure those who are opposed to him. It is of innocent appearance, and involves the principles of deceit and camouflage. A donkey carries four or five harquebuses or *chevrettes* set up to be fired by a train from a wheel lock to which a cord is attached by which it may be released at will. The guns may be covered with a cloth so that the donkey appears to be loaded with baggage and then, when the donkey has been maneuvered into a favorable position, the cord is pulled. Lorrain's ingenuity included also a cart loaded with sticks of wood, bored out like muskets and arranged to shoot bullets or pieces of iron.

### First Food

**D**URING the beefsteak era of nutritional thought, the term "protein" was coined from the Greek *prōteios* meaning "primary" or "holding first place." In time this derivation proved to be inept, for no single food factor may now be considered pre-eminent. Food energy, proteins, fatty acids, vitamins, and minerals each have unique and essential functions. Furthermore, protein is now known to be not one but a number of substances, some highly nutritious, others deficient in this respect.

Protein's main nutritive function is to supply material for growth and repair of proteinaceous body tissues and for elaboration of secretions. Food proteins have varying value in this function because of their differing content of amino acids, the units which compose the large and complex protein molecule. Every animal species has rigid requirement for certain of the amino acids in its food supply. None requires a dietary source of all the 22 known amino acids, for some animals can convert one amino



*This planned double exposure traces the complicated jumble of motions involved in making a bed. Little wonder the lady looks just a bit irate.*



acid to another metabolically, and others produce these substances in their digestive tracts by bacterial action. Furthermore, certain amino acids may be needed only for functions unique to particular genera, as for instance the glycine and arginine required in large amounts by chicks, apparently for the formation of feathers.

Pioneer work on requirements for individual amino acids was done years ago by William C. Rose of the University of Illinois. Using the albino rat, he established that this animal requires 10 of the amino acids in its dietary. In view of the close parallelism between the protein metabolism of the white rat and that of the human being, Dr. Rose's findings were taken as directly applicable to man. Then recently this same investigator used human subjects to check these conclusions directly. His findings, subsequently corroborated by others, showed that the 12 amino acids dispensable to the white rat are equally unnecessary to the human being. Of the remaining 10 amino acids one, histidine, also proved to be dispensable to the adult man. Another, arginine, was found to be unnecessary for maintenance but essential for normal elaboration of reproductive cells in the human male. In short, the human organism requires for maintenance adequate dietary amounts of isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. Men also need arginine for full reproductive function.

Long before individual amino acid requirements were studied, the value in human nutrition of certain whole proteins had been established empirically, in broad qualitative terms. Thus most vegetable proteins were known to have but fair value, animal muscle proteins to have good value, and the proteins of milk and eggs to be superior.

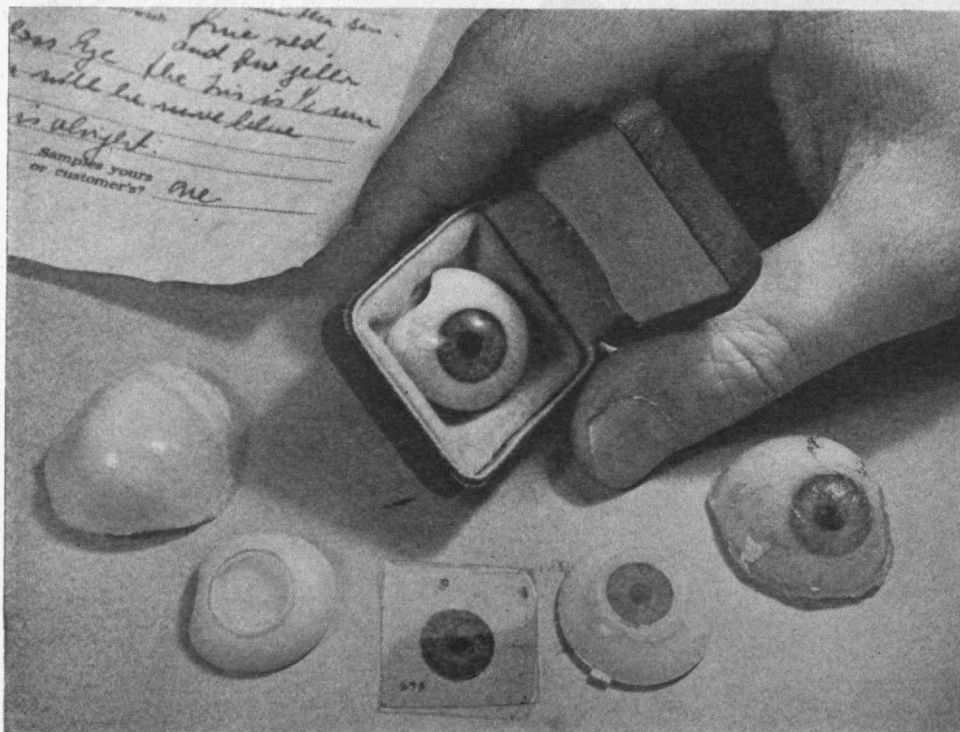
Two recent developments have led to rationalization of these facts. One is Professor Rose's definitive establishment of the amino acid requirement of man. The other is availability of microbiological methods for amino acid assays, as discussed in "The Trend of Affairs" for Feb-

ruary. A rapidly accumulating body of data from these assays shows that the proteins long recognized as excellent for human nutrition constitute abundant and balanced sources of the amino acids now known to be required by man.

## No More Glass Eyes

ONE of the most notable achievements in the use of plastics as substitutes for other better known materials was announced recently and is an interesting advance in medicine. This is the plastic artificial eye developed to take the place of the glass eye which has come down through generations as an expensive, staring disfigurement that is a burden to its wearer and a constant annoyance to doctors, who must refit their patients with new eyes at frequent intervals. Glass was adopted years ago because it was the only material capable of being colored and shaped to make a reasonable replica of the good eye remaining. But nobody was satisfied with it. Hundreds of thousands of people have had to wear glass to replace eyes lost in industrial accidents or by disease, putting up with the consequent inconvenience and expense as best they could. The new thousands among the disabled veterans who will need artificial eyes have something better to look forward to. The timely invention of the plastic eyes means that these unfortunate people can have an inexpensive artificial member which is an absolute duplicate of the good eye, which can be worn with complete comfort, and which need seldom, if ever, be replaced.

For many years oculists have been hoping for an artificial eye that would be a faithful reproduction, unbreakable in ordinary use, unaffected by body acids, and, above all, easy to fit and to refit as the shape of the patient's eye socket changed with age. Glass did not fill these requirements any too well. Although the best glass eyes, made by outstandingly skilled artisans, were often incredibly good likenesses, they were difficult (*Concluded on page 332*)



The components of a plastic eye, with a completed example



American Airlines, Inc.

# Atlantic Flight

## *The Effect of the Air Age on Peacetime Overseas Travel Can Be Surmised through Reviewing the Record*

BY EMMONS J. WHITCOMB

ATLANTIC flight in the postwar years comes increasingly to be a topic of discussion and prediction as we read that in 1943, 42-ton flying boats shuttled across that ocean 430 times, carrying a total of 16,000 passengers; that in the first six months of last year, 1,717 crossings were made by the planes of another air line, 403 of them in the month of June alone; that in one week three planes each made three round-trip crossings, averaging 15 hours a day in the air; that a Canadian plane traveled in January from Montreal to Great Britain in 11 hours and 14 minutes; that — It is not necessary to pile up further examples. The Age of Air has arrived. The principal deterrent, fear of flying, has been overcome. Two years of wartime flying without doubt advanced ocean flight by at least 10 years over what peacetime development would have permitted.

But is the arrival of the Age of Air likely to change habitual peacetime overseas travel as some observers suggest? A number of facts are available to throw light on possibilities. Before they are discussed, it is important that we eliminate one existing factor which easily may influence judgment in the wrong direction: The present great volume of air-borne passenger traffic is a wartime phenomenon; many persons are using planes of necessity and at government expense rather than from their own private funds. Though there will be a considerable amount of this sort of travel for years to come, we are not concerned with it in attempting to evaluate the future of Atlantic flight. Rather, we are concerned with the question of whether the traveler for pleasure and the traveler on private business will fly, and to what extent. In years past, persons traveling for pleasure have spent

\$150,000,000 a year in European visits; it is the traffic portion of this expenditure that the air lines must look to for the backlog of their future peacetime operations.

The comparative costs of airplane and steamship travel to the tourist or pleasure traveler will largely determine the extent to which the plane will supersede the steamer. From their wartime operations, the air lines are learning what it will cost to operate service between the United States and Europe by way of Newfoundland and Ireland, and by way of Bermuda and the Azores. This experience will be of great aid in determining at what rates prospective passengers can be carried at a profit. Developments in radio communication, instrument flying, and meteorology have contributed to making ocean flying as near an exact science as is possible.

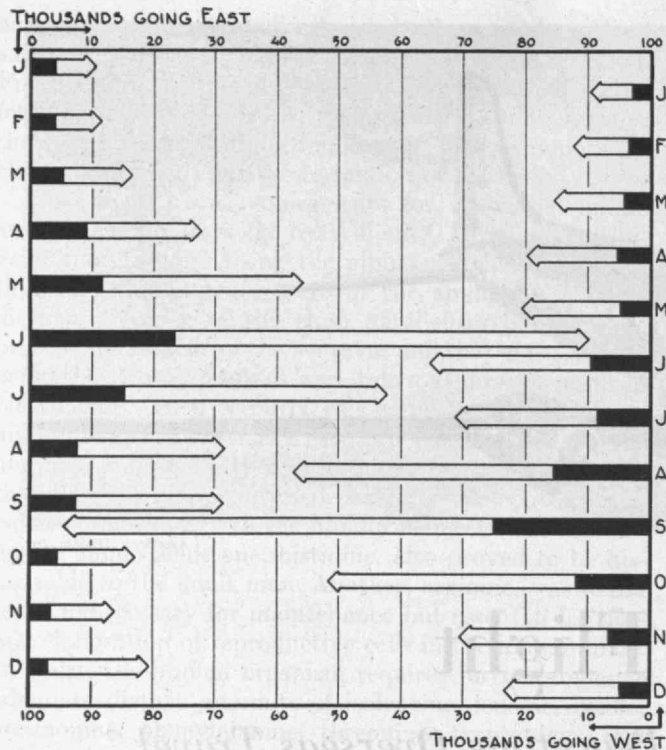
The aircraft themselves have been tested and proved; the Army's C-54 — the DC-4 in commercial service — had completed more than 6,000 ocean crossings by last September. This type of ship, or the newer and faster version known as the DC-6, is to be expected to be used to the greatest extent in Atlantic flight for the first five years after the war is over. Answers to the practical operating issues thus are numerous and dependable. Answers to the cognate and equally important economic question "Can the plane offer a fare to Europe which will be attractive to the tourist?" are numerous.

It still requires 20¼ hours to fly the 2,647 miles from New York to San Francisco, and the cost is \$138.85 (plus taxes), slightly more than 5.1 cents a mile. From New York to London is 3,471 miles. At the 5.1-cent rate, flight across should cost about \$177, or \$354 for the round trip. The tentative timetable for world air

Above:

*A DC-4 — peacetime precursor of the Army's C-54 — in flight*





Transatlantic traffic in Conference vessels by months in the banner year of 1937. Solid areas represent cabin and first class.

service as of July 15, 1948, published by one major air line, however, indicates a round-trip fare between New York and London of \$186. An eastbound flying time of 13 hours and 48 minutes is listed, with five flights daily. There can be no question as to the flying schedule; the Army's C-54's are making the trip now in 15 hours, and with improved engines and design in the DC-6 it is reasonable to conclude that the shorter time is feasible. But much less so with the estimated fare of \$186 for round-trip passage.

Such a rate is about 2.7 cents a mile — perhaps possible with later developments, but hardly to be expected within a period of little more than three years. A projected rate structure closer both to realization and to present practice is that of another air line which last fall in seeking a franchise to operate from New York to London and beyond set the New York-London fare at \$263.80 and the round trip at \$527, and stated its readiness to commence operation of a daily flight on this basis. But even this proposed rate does not compare very well with present tariffs. Capacity loads are being carried across the Atlantic by the short northern route; the fare is \$600 for a one-way passage. Even when due allowance is made for the fact that present passenger traffic is wartime traffic and operation is subject to wartime hazards, the spread between \$263.80 for a New York-London flight and \$600 for the northerly jump is a considerable one.

Any prediction concerning fares for Atlantic flight in the postwar years is necessarily based on assumptions about the volume of traffic to be expected. We have today the aircraft that will carry tourists and businessmen to Europe. We have the trained personnel to fly them. We have the experience of wartime operation. We have the airports and the radio equipment. The question "Can the plane offer a fare to Europe which will be attractive to the tourist?" depends for its answer upon the answer to another question: "Have we the potential passengers

to fill a fleet of aircraft under normal peacetime conditions, and how large a fleet will be necessary?"

As long ago as May, 1942, Edward Warner, '17, vice-chairman of the Civil Aeronautics Board, lecturing before the Royal Aeronautical Society in London, predicted an ultimate travel level of about 300 persons daily each way between Continental Europe and Canada and the United States. In his book *Wings After War*, Lieutenant Commander S. Paul Johnston, '21, in 1944 estimated that at the end of five years we might get to the level of 200 passengers daily each way, with good chances of reaching the 300 a day at the end of the first postwar decade. With 50-passenger aircraft available during the latter part of the first five-year period and each plane averaging four round trips monthly with a 75 per cent payload, Johnston reckons each ship to handle 300 passengers each month. A fleet of forty 50-passenger craft operating on this schedule would handle 200 passengers each way each day, or 146,000 yearly, halfway through the first postwar decade. At the end of that decade, according to Commander Johnston's reckoning, the yearly volume would be 219,000 passengers.

The banner year of the last 10 years in terms of transatlantic travel was 1937, when 375,085 passengers went from North America to Continental Europe and 405,081 traveled westbound to this continent — a total volume for the year of 780,166. Of those Europe-bound, only 100,980 — 26.9 per cent — journeyed in cabin or first-class accommodations; westbound, the cabin or first class passengers amounted to 101,740 — 25.1 per cent of all America-bound passages. The total volume of cabin and first-class traffic for the year was 202,720. The adjoining graph presents the picture.

These passengers paid rates depending on the time of year in which they traveled. The steamship lines charged the higher "in season" rates for eastbound passage from about May 24 to July 25, and for westbound passage from about July 28 to September 26. "Winter rates," which applied for the rest of the year, were on a lower basis. The range of rates, varying with different types of steamers, is summarized thus:

*Minimum Round-Trip Steamship Rates  
United States and Canadian Ports  
to English, North Atlantic, and Mediterranean Ports*

Cabin Winter	Cabin Summer	Tourist Winter	Tourist Summer	Third Winter	Third Summer
\$240-523	\$260-564	\$170-269	\$196-291	\$146-185	\$150-195

A four-and-a-half-day express liner such as the *Queen Mary* had a minimum cabin-class rate for the round trip of \$564 and on a "high season" sailing in June would carry over 600 passengers of this class, many of whom of course paid a premium for accommodations above the minimum. For smaller and less speedy ships, the rates were proportionally lower.

These figures emphasize that the potential transatlantic air traveler will be drawn from the price group established for the cabin-class traveler of former days. It seems unlikely that a large number of tourist-class passengers will fly, for cost is a major factor with them and speed is not so important. Possibly the greater number of travelers using steamer in one direction and plane in the other will come from this class. Hence the figure of interest is that for cabin-class steamer travelers. In 1937, the cabin, tourist, and third-class (*Continued on page 314*)

# Lilliput Revisited

## Reynolds, Froude, Dimensional Analysis, and Dean Swift

BY MILTON B. DOBRIN

IT HAS been well over two centuries since the Dean of St. Patrick's Cathedral in Dublin gave vent to his embitterment over some earlier political reverses by writing satires which were to become classics to the entire English-speaking world. The best known of these satires is today more often looked upon as a story for children than as a masterly piece of political invective, but it is still enjoyed by readers of all ages. The author was Jonathan Swift; the book, of course, *Gulliver's Travels*.

The story around which the satire was written deals with the manifold adventures of one Captain Lemuel Gulliver who, through various mischances, was cast ashore upon strange lands, all having long, odd names and even odder inhabitants. The first two territories he visited and described have become as real to us by now as any fictional countries could be. One was Lilliput, where Gulliver found an island peopled by a race of pygmies one-twelfth his size in every dimension, every natural object being reduced by exactly the same factor. The other was Brobdingnag, where the relation was reversed, the citizens there being giants 12 times Gulliver's size, with everything else in similar proportion.

According to Swift's account, neither the reduction of scale in Lilliput nor its magnification in Brobdingnag affected the shapes of common objects or the daily lives and habits of the people. Except for the general scaling down or up in size and certain differences in political and social organization, there was no discernible distinction between the Britain of Swift's day and the imaginary territories visited by his creation, Gulliver.

We know now that other differences would be inevitable in such countries, if they existed, but we should not condemn Swift for his failure to realize that fact. If that failure seems obvious to us, it is only because we are familiar with mathematical and experimental studies made long after Swift's time on the relationships between dynamic scale models and their prototypes. It was only a short while before *Gulliver's Travels* appeared that the pioneering treatise was published which provided the basis for all subsequent work on the theory of models. This was

Newton's *Principia Mathematica*, which first set forth the mechanical principles that must be taken into consideration. Even so, Swift showed undeniable prescience for a layman in scientific matters when he pointed out how the Lilliputian mathematicians calculated Gulliver's daily food ration:



Drawings by Henry B. Kane, '24

The reader may please to observe, that . . . the Emperor stipulates to allow me a quantity of meat and drink sufficient for the support of 1728 *Lilliputians*. Some time after, asking a Friend at Court how they came to fix on that determinate number; he told me that his Majesty's Mathematicians, having taken the Height of my Body by the help of a Quadrant, and finding it to exceed theirs in the proportion of Twelve to One, they concluded from the Similarity of their bodies, that mine must contain at least 1728 of theirs, and consequently would require as much Food as was necessary to support that number of *Lilliputians*. By which, the Reader may conceive an idea of the Ingenuity of that People, as well as the prudent and exact oeconomy of so great a Prince.

It was not until the latter part of the Nineteenth Century that the groundwork was laid for computing the more complex relationships between Gulliver and his diminutive hosts. This work arose not from abstract studies by pure mathematicians, whom Swift apparently despised, but from practical investigations by engineers into such irrelevant subjects as the flow of water through pipes and the propulsion of ships. The leading contributors to this field were Osborne Reynolds and William Froude, who developed a simple but powerful technique which formed the basis for what is known today as dimensional analysis. These researches were carried out by measurements on small-scale models. In order to apply the results to full-scale systems, it is necessary to determine just how the various physical quantities associated with the model are related to the corresponding quantities in the prototype.

The technique they used was based on the concept of dynamic similarity, which exists when all forces acting on the model are in the same ratio as the corresponding forces acting on the original. When this similarity is established, dimensionless ratios involving length, speed, viscosity, and so on, can be set up which define the physical situation uniquely, regardless of the dimensions of the system. The best known and most widely used of these ratios is Reynolds' number, which applies to the flow of fluids through pipes as well as to the flight of aircraft. From it we discover that if a model plane is one-tenth the length of its prototype, the air must flow past it at 10 times its full-scale speed if flight conditions are to be identical. In a similar way, Froude's number specifies the relationships that obtain between ships and their models: If a ship model is a hundredth the length of its prototype, this





number tells us that a towing speed one-tenth the original will result in equal flow resistance per unit weight.

The widespread present-day engineering use of model tests based on these principles has led to the establishment of numerous wind tunnels and model basins where modern Gullivers make daily visits to a Lilliput that Swift's voyager would never recognize. The metamorphosis of the Wrights' original contraption into the B-29 has been immeasurably accelerated by wind tunnel tests on scale models of new types of planes. From such tests, many of which have been carried on in Technology's pioneering tunnels, defects in design that would otherwise show up only in a test flight could be remedied at an early stage. Model theory furnishes the key for applying to the design of the prototype the data so obtained. Entirely comparable are the practical benefits that have resulted over the past half century from tests run on ship models in towing tanks. Greater speed, maneuverability, and efficiency both in merchant vessels and in warships can be credited to this work. The war has caused an enormous increase in the amount of such testing, particularly at the Navy's new David W. Taylor Model Basin just outside Washington, where extraordinarily precise scale models of hulls for new naval vessels are subjected to exhaustive tests that determine the performance of the full-scale ship long before its shakedown cruise.

To the engineers who design and run these tests in wind tunnels and towing tanks, the idea of a world built to the scale of their model airplanes and ships would immediately suggest the limitations that this reduction would impose upon many of its activities. If Swift had possessed an engineering background in the Twentieth Century instead of a clerical one in the Eighteenth, he surely would have depicted Lilliput as a country deviating from his own exactly as predicted by dimensional analysis.

Consider how he would have treated the Lilliputians themselves. Even if it is assumed that they were built in exact proportion to human beings of normal size, with all linear dimensions one-tenth as great (this figure is more simple for calculations than one-twelfth), their daily lives would still be different in many respects from our own. In the first place, they would be amazingly strong for their size. With us, anyone powerful enough to hold two of his neighbors over his head could get a job with a circus as an acrobat. Among the Lilliputians, almost anybody could support the weight of a half dozen of his fellow citizens without exciting any comment. If in a hurry to get upstairs, we might run up two steps at a time, but a Lilliputian could leap up a whole flight of his stairs without undue effort. If he wanted to move a grand piano downstairs and across the street, he could probably do so without the aid of the usual moving crew from the transfer and storage company. The secret of his strength is not in the brand of spinach grown in Lilliput; its explanation is based entirely

on mechanics. The strength of a bone, muscle, or any other structural member is measured by the force it can support or exert per unit of cross-sectional area. If all linear dimensions are reduced by a factor of 10 with materials unchanged, all weights are cut down by a factor of 1,000. However, the cross-sectional areas that must support these weights are reduced by only 100. Hence the force per unit area is only a tenth of what it was before and the potential strength is increased tenfold. On this basis, if a normal person can lift his own weight, a Lilliputian should be able to lift with equal ease a block weighing 10 times as much as he does.

Another distinction between the Lilliputians and ourselves would be in the higher pitch of their voices. This is explained by the shortness and narrowness of their vocal cords as compared to ours, as well as by the changing resonance characteristics of their mouths. Their dominant pitch should range from about 1,500 to 5,000 cycles a second, which should result in unpleasantly shrill conversations. Moreover, their telephones and radios would have to be unduly elaborate and expensive to give good response in this frequency region. The only consolation that might be derived from this situation, as far as the Lilliputians are concerned, lies in the possibility that their babies might carry on their screaming at such a high frequency as to be inaudible.

In his description of Lilliput, Gulliver remarked on the sharpness of the inhabitants' eyesight, having watched, for example, a girl threading an invisible needle with invisible silk. Actually, their vision would be, in proportion, much less acute than our own. The reason lies in the decreased resolving power of any optical instrument, such as the human eye, when the size of its aperture is cut down. The minimum angle between two points which the normal human eye can separate is about one minute of arc. This angle is inversely proportional to the diameter of the pupil and would be 10 times as great for a Lilliputian. Even though he holds his book 10 times as close to his eyes as we do, the smallest type he can read is the same size as the smallest we can read. In proportion to the dimensions of his pages, his type would thus have to be 10 times the size of ours for comfortable reading. This allows fewer letters per page and requires thicker and more unwieldy books and magazines.

There would be other differences between the Lilliputians and ourselves which might not be obvious to an ordinary visitor but should not have escaped Gulliver's notice, since he was a ship's surgeon by occupation. Consider their pulse rate. We should expect it to be greater than our own, because the volume of blood pumped during each heartbeat, one-thousandth as much as with us, would have to supply one-hundredth the lung area. For this relatively greater area to be (Continued on page 320)



# The Opening Road

## *Postwar Highway Construction Plans in Latin America Promise Expansion and Multifold Opportunity*

By EDWIN W. JAMES

FROM the point of view of historical development, the progress of mankind has been from east to west. Considered fancifully, the planet earth has seemed to revolve under a sheath of human effort consisting of exploration, mass immigration, commercial development, and the course of empire, as though these forces were striving to hold their place under the sun, until in the Twentieth Century, contrary to Kipling, these twain have met, physically if not spiritually.

If human activities during the last quarter century in the Western Hemisphere are to be interpreted in the light of present tendencies, the United States is going to shift its interests in no inconsiderable degree through an entire quadrant and along the meridians to the southward as it has in the past along the parallels toward the west. To the south for 6,000 miles stretches Latin America. Overenthusiasm at times has perhaps exaggerated the natural potentialities of the other American republics, but after we have discounted enthusiasm and have faced the fact that these republics have large areas of laterite soils, there remain a tremendous residuum of natural resources and a magnificent opportunity to extend the energy and products of the temperate zone to the work of raising the standard of living of an entire continent.

At the present time all these countries suffer from a lack of adequate internal communications. In the extreme north and south, Mexico and Argentina have made commendable progress in railroad construction, and these and several other countries have made advances toward the development of highways. But generally, all of them still remain in the condition that characterized the United States in the last decade of the Nineteenth Century, when our first state highway departments were being established. Few of them have more than rudimentary highway systems.

Today there exist an integrated plan for a Pan American Highway system in South America and a definite program of construction of an Inter-American Highway through Mexico and the Central American republics to connect the main bodies of the two continents. The government of the United States is aiding financially in

the construction of that part of the Inter-American Highway extending from the southern frontier of Mexico to the Panama Canal, having determined that in this section it has a national interest by reason of its holdings and operations in the Canal Zone. The work of survey and construction is being financed from a joint fund of which the United States provides two-thirds and the several countries one-third, according to their respective interests. Work under these provisions, contained in an act of Congress, has been in progress since December 26, 1941. Agreements have been signed by all the governments concerned, from Guatemala to Panama inclusive, and construction is at present active in all but Panama. As far as possible, uniform standards of design are being used throughout, providing for a six-meter bituminous penetration surface. Geometrical design calls for a maximum 7 per cent grade compensated for curvature; transition curves; a minimum radius of 50 meters (114-degree metric curve) on open curves; and radii ranging from 60 to 300 meters on outside curves for design speeds of from 25 to 60 miles an hour, respectively. All surveys and plans follow the metric system except bridge plans, which for commercial reasons adhere to the English system.

The road at the present time is uninterruptedly open and transitable by motor vehicles from Tapachula,



Public Roads Administration

Heavy equipment in a big cut along the Inter-American Highway in Costa Rica. Three scrapers removed by caterpillar tractors are seen here. The dozer that helps with the loading is waiting at the left. A few rocks have been encountered in this cut, but so far no shooting has been necessary.





Public Roads Administration

*In the Buru River Valley, a typical jungle scene along the Inter-American Highway in Costa Rica, photographed by the War Department in September, 1943.*

Mexico, near the Guatemalan frontier, to the northern border of Costa Rica, a distance of 860 miles. The actual condition of the road in the several countries varies, however, and even within the countries conditions vary from section to section owing to the fact that some sections have in the past been constructed independently by the different countries, some old roads are followed, and in some places only partial construction has been accomplished because of limited finances.

Present operations, therefore, include not only complete construction but also realignment and reconstruction or surfacing. This latter condition prevails through most of Guatemala, where a gravel, crushed stone, or volcanic tufa base exists throughout approximately 300 miles. In El Salvador, complete new construction is under way from San Miguel to La Unión and to the Goascoran River at the Honduras line. The rest of the road in El Salvador has black top surfacing. In Honduras, there are two sections — one between the Goascoran River and Nacaome, and one between Choluteca and Las Cabezas, aggregating about 35 miles — which are ready for the wearing course. Elsewhere, relocation or complete construction is in progress. In Nicaragua, a construction road with a crushed stone base using run of crusher exists from the Honduran line to a point north of Estelí; from there to the Costa Rican line is road in various stages of completion, ranging from water-bound stone base to bituminous penetration.

In northern Costa Rica, for 150 miles, complete construction is required on all but about 15 miles, on which grading and base courses have been completed. Across the central plateau in Costa Rica, where a large fraction of the population is concentrated, are 75 miles of finished

concrete or bituminous road. Following this comes the critical mountain section over the continental divide, which climbs to the highest elevation reached anywhere on the route between the United States and Panama and involves the heaviest construction ever undertaken. Here, between Cartago and San Isidro del General, a distance of about 72 miles, the line rises from an elevation of 5,000 feet at Cartago to 10,930 feet at the pass and descends to San Isidro at 2,200 feet. For about 25 miles the line is about 8,000 feet. The mountains are in an advanced but not matured state of erosion. Some saddles are not much wider than required for construction, and slopes are excessive, 45- and 60-degree faces being common. Gorges are fearsomely deep and the slopes unstable. Safety belts have been used by both surveyors and workmen. On one 36-kilometer section of the project down the Pacific slope, the excavation averages 172,000 cubic meters per kilometer, and kilometer 21 has 366,000 cubic meters, which is at the rate of about 775,000 cubic yards a mile. Obviously, the work is attended by heavy slides in the rainy season between December and May.

This mountain section extends to El General Valley, an area of great potential agricultural wealth and heretofore practically isolated. The region carries a stand of virgin oak reported by investigators from the United States Forest Service to be one of the finest still available in the world. Until construction opened a pathway into and along the mountain range, this timber was beyond reach. El General Valley is reputed to have land suited to bright tobacco, the cigarette grades raised in Virginia and North Carolina, and it had remained practically inaccessible until a construction road from Dominical, a spot on the coast, to San Isidro was opened as a part of the current project. As an area for postwar development, the region presents the most attractive prospect that Costa Rica has.

When William F. Shunk conducted the surveys for the proposed Intercontinental Railroad through Central and South America, he did not enter El General Valley because of the difficulties presented by the enclosing mountain rim, but he said in his account of the survey:

All reports agree that this reach of the survey through the wilderness, along a trail little used — mainly by barefoot Indians — is going to exercise us more severely than anything we have done heretofore.

And a few pages later he added:

We thought we had seen in South America the worst roads in the world. But it is pardonable extravagance to say that the Priest's road, as now extant, ranks worse in the universe. None but itself can be its parallel. It cost us three more good mules and weakened the whole herd by excessive labor. . . . Previous reconnaissance indicated . . . the possibility of a railroad line ascending the Savegre to the summit between that river and the Pacuar . . . thence descending the grand valley locally known as El General to the Paso Real. The scheme invites future examination. As already noted the conditions of our work obliged us to pass it by for the open way along the seaboard.

Construction narrowly considered has presented no serious difficulties except in Costa Rica. No frost is encountered anywhere along the line in Central America. There is little swampland and the worst of this is strangely enough at elevations around 8,000 feet where volcanic dikes have impounded ground water. But operations ancillary to construction have been (*Continued on page 326*)

# Lightning Assembly

## *Wartime Demands Have Turned the Custom-Made Airplane into a Mass-Production Item*

BY RONALD A. WHITE

**A**T THE time of Pearl Harbor, airplanes were largely custom made. Foreign orders had shown the need for mass-production methods, but little had been done inasmuch as schedules could be met by an increase in employees, machines, and production areas. On the surface this solution seems absurd. The problem, however, was not merely one of accepting procedures used in other industries; airplanes were designed not for simplicity in production but for superiority in performance. The tremendous demands imposed on all industries by our entrance into the war soon practically exhausted the supply of labor and available factory areas. The airplane industry was faced with the problem of tripling and quadrupling production with essentially the same factories and an ever decreasing number of skilled and unskilled workers. Its success is well known.

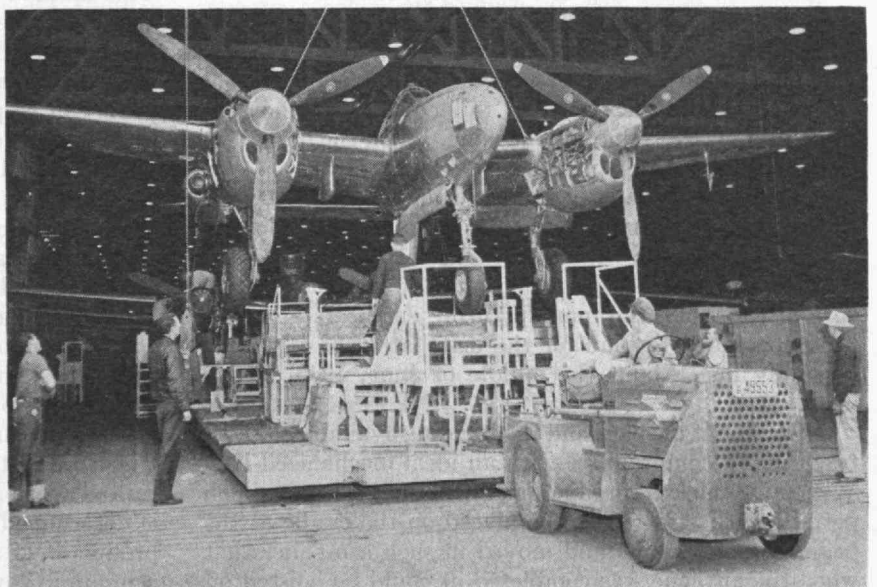
Though war schedules have necessitated additional drop hammers, hydraulic presses, shears, punch presses, and other fabricating equipment, and have caused the development of such new equipment as stretching presses, basically the problems of fabricating the various units of an airplane have not been much altered. Increased production, however, has materially changed the methods of assembling airplanes. Prior to the war, the various units were manufactured and brought together at a definite location where the airplane was assembled. This procedure was satisfactory as long as only a small number of airplanes were being built, since they could be moved out of the factory easily when completed. As more planes were produced, a new method of assembly had to be developed because the completed planes could be removed only through the hangar doors, and traffic lanes were not possible in the limited space available.

The first solution was to establish production lines and move the airplanes toward the doors at periodic intervals. Such was the early technique for assembling the Lockheed Lightning fighter plane designated as the P-38. The individual airplane came into being at the mating jigs. Here the center section was put into the jig and the twin booms were attached. Then the plane was hoisted onto its cradle and moved into the production line by a tractor. At the beginning, there were four lines of planes. In the first station, the *empennage* was attached to the end of the booms and other installations were started. The planes were pulled from station to station at periodic intervals determined by the schedule. After they had moved through half the length of the building, the planes

were divided into two lines to make room for the installation of the wings. The plumbers swarmed over the ships, installing hydraulic, gasoline, and oil lines. The electricians started the installation of their equipment. Confusion resulted. The inefficiency of this method became apparent, and the functional assembly of the airplane by specialized groups was abolished.

In its place a system of kits was installed. The manufacturing engineers organized units of production and scheduled them in the proper sequence of installation. These units, or kits, were not necessarily limited to one type of installation; they included plumbing, electric lines, and any other assemblies which were necessary. The advantages were immediately apparent: Employees with specialized training were no longer required. Each unit could be illustrated by a production drawing, and new workers could be trained easily in the installation of one or more kits. The production illustrations, incidentally, have played an important part in the phenomenal output by inexperienced workers, and the drawings have greatly simplified the training program. They are better than photographs, as they can include "exploded" views, the correct sequence of installation, and other specific instructions. A worker with no experience in airplane production can perform the work in a relatively short time by using the production illustrations.

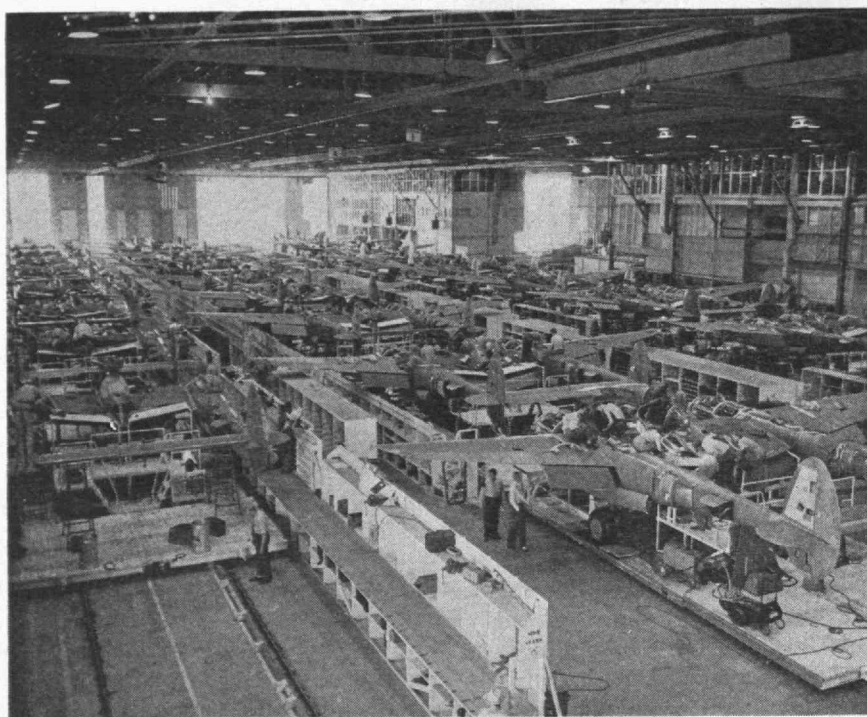
As long as the schedule did not require that the ships be moved oftener than every four hours, a periodically moving production line was comparatively efficient. During the lunch period or between shifts, the tractors pulled the ships on their cradles from station to station, and at the



Lockheed Aircraft Corporation

*A Lockheed Lightning—the P-38—comes to the end of the final assembly line.*





Lockheed Aircraft Corporation

*The orderly vista of assembly lines*

final station the overhead hoist removed the plane from the cradle and put it at last on its own wheels.

At the North American aircraft company, the planes were connected to each other, making a single production line, which was moved by mechanical means from station to station at periodic intervals. At the time that plans were being made at Lockheed for a continually moving line, the North American production line was being moved every two hours. These periodic moves resulted in confusion and inefficiency, as work on the planes had to stop during the shift between stations. The increased demand for more and still more P-38's made it apparent that soon the station moves would have to be so frequent that efficient operation was impossible. One solution would have been the construction of new factories to increase the assembly area, but there was no time. Accordingly, studies were started to develop new assembly methods.

Many of the old-time airplane manufacturers were convinced that the continually moving line would not work. The modern airplane is an extremely complicated mechanism designed basically as a "tailor-made" airplane instead of a mass-production machine. When the design for the Lightning fighter plane was made, there was no idea of the tremendous number which would be required, and accordingly the entire emphasis was placed on the efficiency of operation, with little thought to ease of production. In spite of the opposition and the complicated nature of the P-38, the manufacturing engineers at Lockheed continued to plan for the installation of a moving assembly line. About the middle of June, 1943, it was installed.

The amount of space and the building available necessitated many compromises with an ideal mechanized line. The most efficient production line would be one which permitted the airplane to be placed on the cradle at the beginning of the line and moved in such a manner that when the airplane was completed, it could be hoisted off the line near the beginning point. In this way, the cradles

could rotate and be ready for the next airplane to come from the mating jigs.

In order to obtain sufficient length, the Lockheed production line actually consists of three parallel lines. The plane moves in a forward direction through one line, is then pulled to the second line and moves backward, and is again pulled to the third line and progresses to the end, where the hoist removes it from the cradle. The cradle is then towed outside the building back to the beginning of the line.

The mechanical design of the moving line was studied for some time. Many suggestions were made, one of the most ingenious being that the cradle consist of a floor-level platform rolling on light railway tracks below the working level; the plane would be supported by two hydraulic hoists located at the balancing points on the main beam and therefore could be raised or lowered in accordance with the area where the work was to be performed. Such a plan would have given great flexibility. It was discarded, however, because of its radical departure

from past experience with cradles whose various platforms were so arranged that the different parts of the airplane were accessible to the workers. There was also the possibility that the sequence of installations would transform the production line into a series of regular "jumping beans."

As installed, the tracks were placed on the floor, and the existing cradles were reworked with proper wheels, with electric trolleys running in a conduit in the center of the tracks, and with connections for air pressure. Permanent sidestands were built to hold the various parts to be installed, with the working level approximately four feet above the floor. Racks, to which stock is delivered, were constructed in a continuous line adjacent to an aisle paralleling the sidestands. Kits are made up from the stockracks and placed in the sidestands for the workers. This method of stock distribution has proved more efficient than the old method of having a large central stockroom where the kits were made up and delivered to the various airplanes. Now with a minimum effort, kits or parts can be prepared and delivered to the exact spot of usage. By the time the airplane reaches the third line, practically all of the parts are assembled, and accordingly no sidestands are necessary. In this line, a moving workstand is attached to each cradle and progresses through the entire length with the airplane. These stands are then returned to the beginning of the third line.

The mechanism which moves the line is a motor-driven chain which operates under the length of one airplane in each line. The cradles in each line are connected and pulled by a bar on the first cradle, which drops into the cogs of the driving mechanism. During the transfer between lines, the motor is stopped, but work is not disrupted, as the line moves very slowly. Although its speed is determined by the number of airplanes scheduled for production, its average speed is approximately five inches a minute. Power is supplied by a three-horsepower motor and a reducing gear drive. (Continued on page 312)

# THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

## For National Security

**P**RESIDENT COMPTON has been appointed chairman of the executive committee of the Research Board for National Security, which has been created to serve after expiration of the present Office of Scientific Research and Development, of which Vannevar Bush, '16, is director, until establishment of a permanent agency to direct government research. The new board is composed of civilian and military scientists whose responsibility it will be to direct research for the development of weapons for any future war.

Establishment of the new board was announced jointly by Secretary of War Stimson, Secretary of Navy Forrestal, and Frank B. Jewett, '03, President of the National Academy of Sciences. Meantime, a Committee on Post-War Research has recommended that the government establish a permanent agency charged with the scientific development of weapons of war.

The interim board, which will operate until the new agency is decided upon, will according to announced plans be composed of 20 civilian scientists, with an equal number of officers representing the Army and Navy.

Members of the executive committee of the board, in addition to Dr. Compton, the chairman, are Roger Adams, department of chemistry, University of Illinois; A. H. Dochez, College of Physicians and Surgeons, Columbia University; Brigadier General W. A. Borden, special staff and director of new developments division, War Department; and Rear Admiral Julius A. Furer, '05, co-ordinator of research and development, Navy Department.

The Army delegation to the Research Board includes Maj. Gen. Wilhelm D. Styer, '22, Chief of Staff, Army Service Forces, and Edward L. Bowles, '22, Professor of Electrical Communications at Technology and now Special Consultant to the Secretary of War. In the Navy representation is Rear Admiral E. L. Cochrane, '20, Chief, Bureau of Ships. The civilian group includes Bradley Dewey, '09, former Rubber Director, and Jerome C. Hunsaker, '12, Head of the Departments of Mechanical and Aeronautical Engineering at the Institute and chairman of the National Advisory Committee for Aeronautics.

## Head of Department

**A**PPPOINTMENT of William N. Locke as professor and head of the Department of Modern Languages at the Institute has been announced by President Compton. Dr. Locke, formerly a member of the staff of Harvard University and now overseas on special assignment for the Office of War Information, will succeed Professor Ernest F. Langley, who retired last year.

Dr. Locke was born in Watertown, Mass., the son of Mrs. John W. Locke, now of Troy, N. H., and the late Mr. Locke. He was prepared for college at Phillips Exeter Academy from which he entered Bowdoin College and was graduated with the degree of bachelor of science



William N. Locke

*cum laude* in 1930. In 1935 he attended the French summer school at Middlebury and then went abroad for study in Paris at the Ecole de Préparation des Professeurs de Français à l'Etranger and the Institut de Phonétique until 1936. Upon his return to this country he entered the Harvard Graduate School of Arts and Sciences, where he received the degree of master of arts in 1937 and that of doctor of philosophy in 1941.

Dr. Locke's experience in teaching includes positions as master of English, French, and general science at the Emerson School, Exeter, N. H.; master of French at the Shady Hill School, Cambridge; assistant in phonetics and dramatics, Middlebury's French summer school; substitute teacher of English at the Ecole Normale de Montbrison in Loire, France; and instructor in French at Harvard University from 1938 until he joined the foreign staff of the Office of War Information in 1943. He is a civilian member of the Psychological Warfare detachment with one of the American armies now on the western front in Europe.

Dr. Locke is a member of the Modern Language Association and his fraternity is Alpha Delta Phi. In 1938 he married Antoinette Fortin of Brunswick, Maine. They have a daughter three years old and make their home in Newton.

## Boxing the Ballot

**I**NTO the mails this month are to go ballots for the annual election of officers and representatives of some 33,000 members of the Alumni Association of the Institute. Nominee for the presidency of the Association this year is A. Warren Norton, '21, XV, President of Press Wireless, Inc., New York.



The Association's National Nominating Committee — consisting of Samuel C. Prescott, '94, chairman, Albert W. Higgins, '01, Harry L. Havens, '09, Orville B. Denison, '11, Frederick D. Murdock, '13, Frank Maguire, '17, Sherry O'Brien, '17, Raymond R. Ridgway, '20, George W. Spaulding, '21, and Charles H. Toll, Jr., '23 — has nominated for election to the vice-presidency of the Association Alf K. Berle, '27, XV, Office of Field Service, Office of Scientific Research and Development, Washington, D. C.

John A. Lunn, '17, II, Dewey and Almy Chemical Company, Cambridge, and Henry A. Morss, Jr., '34, VIII, Simplex Wire and Cable Company, Cambridge, are nominees for election to posts on the Executive Committee.



© Bachrach

#### FOR PRESIDENT

... of the Alumni Association of the M.I.T., A. Warren Norton, '21, XV, has this year been named by the National Nominating Committee. President and Chairman of the board of Press Wireless, Inc., of New York City, Mr. Norton was in 1940-1941 vice-president of the Alumni Association. After graduation from the Institute, Mr. Norton was associated with Continental Motors Corporation, and thereafter with the Brooklyn Daily Eagle. Later he became a partner in O'Mara and Ormsbee, Inc. Serving as manager of the Christian Science Publishing Company, publishers of the Christian Science Monitor, he was a member of its editorial council, a member of the American Newspaper Publishers' Association, the New England Shippers' Advisory Board, and the Associated Press. He has been a director of the New England Council and its aviation and financial policy committees, a trustee of the World-Wide Broadcasting Foundation, chairman of the Boston Newspaper Salvage Committee, a member of the Boston Committee for Economic Development, and a member of the Executives' Club of Boston. In addition to the presidency of Press Wireless, he at present holds the posts of president and director of Teleradio Sociedad Anonima, vice-president and director of Press Wireless of Cuba, and director and treasurer of News Traffic Board, Ltd. He is a member of the Board of War Communications, being on its industry advisory and radiocommunications committees. Mr. Norton's clubs are the Union League and the Technology Club of New York. His home is in Harrison, New York.

Named for alumni term membership on the Corporation of the Institute are Ellis W. Brewster, '13, II, Plymouth Cordage Company, Plymouth, Mass., to fill an unexpired term for four years; and for five-year terms Raymond Stevens, '17, XV, Arthur D. Little, Inc., Cambridge, retiring President of the Alumni Association; Edward S. Farrow, '20, X, Eastman Kodak Company, Rochester, N. Y.; and H. W. McCurdy, '22, II, Puget Sound Bridge and Dredging Company, Seattle, Wash.

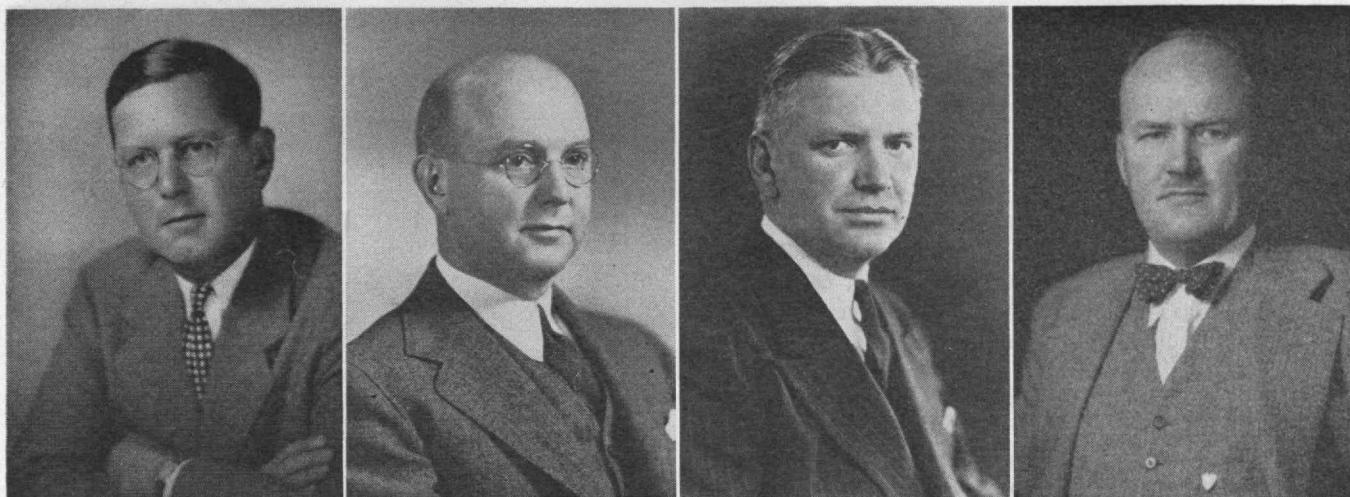
New representatives on the National Nominating Committee are to be elected this year by Districts 3, 6, and 7, to succeed Messrs. Murdock, Spaulding, and O'Brien. The men placed in nomination, one to be elected for each district, are: *District 3*: Edwin C. Alden, '95, VI, the States Company, Hartford, Conn.; Charles A. Williams, '21, VI, United Illuminating Company, New Haven, Conn.; Robert W. Stewart, '24, II, Singer Manufacturing Company, Bridgeport, Conn.; *District 6*: Proctor L. Dougherty, '97, VI, consulting engineer, Washington, D. C.; Percy E. Tillson, '06, VI, Bell Telephone Company of Pennsylvania, Harrisburg, Pa.; Irving W. Wilson, '11, XIV, Aluminum Company of America, Pittsburgh, Pa.; *District 7*: Fred. W. Morrill, '07, I, Ferro Concrete Construction Company, Cincinnati, Ohio; Philip N. Cristal, '17, I, Northwestern Mutual Life Insurance Company, Milwaukee, Wis.; Elmer A. Skonberg, '29, XV, Mengel Body Company, Louisville, Ky.

#### Honored

SCORES of the friends of Emeritus Professor Dugald S. C. Jackson, Head of the Department of Electrical Engineering at the Institute from 1907 to 1935, gathered at the Engineers Club in Boston on the evening of February 13 to celebrate the 80th anniversary of his birth. After a social hour, the company filled the assembly hall at the birthday banquet. The speakers at the head table included President Compton, who presided; Joseph W. Barker, '16, Dean of Engineering at Columbia University; A. Pen-Tung Sah, President of the National University of Amoy, China; Edward L. Moreland, '07, Dean of Engineering at the Institute; Harold L. Hazen, '24, Head of the Department of Electrical Engineering; and Carlton E. Tucker, '18, Executive Officer of the Department. Gerard Swope, '95, formerly President of the General Electric Company, and Frank B. Jewett, '03, formerly Vice-president of the American Telephone and Telegraph Company, on the original list of speakers, were prevented by circumstances from attending.

In his opening remarks, President Compton compared the meeting to a family gathering of old friends and complimented Mrs. Jackson for the contributions she had made to the social life of the Institute. Characterizing Professor Jackson as a man of constructive ideas and progressive vision, Dr. Compton expressed the belief that Professor Jackson had indeed discovered the fountain of youth.

Dr. Jewett, in a letter of appreciation which President Compton read, declared that Professor Jackson had built up the greatest department of electrical engineering that any institution ever had. Best wishes and salutations to Professor and Mrs. Jackson were sent in a letter by Vannevar Bush, '16, President of the Carnegie Institution of Washington and Director of the Office of Scientific Research and Development.



Underwood and Underwood

## TO THE CORPORATION

... the National Nominating Committee this year has named these four Alumni for term membership. From left to right they are Ellis W. Brewster, '13, President and Treasurer, Plymouth Cordage Company, Plymouth, Mass., to fill an unexpired term for four years; for five-year terms, Raymond Stevens, '17, Vice-president, Arthur D. Little, Inc., Cambridge, Mass., and retiring President of the Alumni Association; Edward S. Farrow, '20, Assistant General Manager and Assistant Vice-president, Eastman Kodak Company, Rochester, N. Y.; and H. W. McCurdy, '22, President and General Manager, Puget Sound Bridge and Dredging Company, Seattle, Wash.

Observing that the Chinese had conferred on Professor Jackson their highest honor by calling him a teacher, President Sah brought greetings from China. He reminded the assembly of the special reverence which his people have for age, and proved by an ancient Chinese formula that Professor Jackson is a great diplomat. Dean Barker from personal experience cited Professor Jackson's pride in the success which his students have achieved, and Professor Hazen commented on the fact that Professor Jackson's educational policies were so prophetic and enduring as to have influenced all decisions made since his retirement a decade ago. Dean Moreland spoke of the unusual combination of educational skill and engineering practice that made Professor Jackson a great educator. In behalf of the engineering firm of Jackson and Moreland, he presented Professor Jackson with a set of the "Encyclopaedia Britannica."

Professor Tucker spoke of the 174 letters of greeting and appreciation that Professor Jackson had received from societies, friends, and former students. Before presenting him with a volume of letters bound in tooled leather, Professor Tucker read typical letters received from the American Academy of Arts and Sciences, the American Society of Mechanical Engineers, the Technology Club of Western Pennsylvania, President William E. Wickenden of the Case School of Applied Science, Ralph G. Hudson, '07, Professor of Electrical Engineering at the Institute; Harold S. Osborne, '08, chief engineer of the American Telephone and Telegraph Company; and Brigadier General Forrest E. Williford, '17.

In his response, Professor Jackson parried the various eulogies applied to him throughout the evening by quoting the observation of Josh Billings, "Flattery is like Cologne water which one smells of and enjoys but does not swallow." He expressed his appreciation of the talks, especially the idea that the successful engineering educator must be at once a teacher and a practicing engineer. Remarking his particular pleasure that Mrs. Jackson had received her share of the greetings, Professor Jackson in terms of Wordsworth spoke of her as "The sweetest thing that ever grew beside a human door."

## First Medalist

FIRST recipient of the Leo Hendrik Baekeland Award of the North Jersey section of the American Chemical Society is Edwin R. Gilliland, '33, Professor of Chemical Engineering at Technology, who is now on duty with the Office of Scientific Research and Development in Washington. Announcement of the award, formal presentation of which is scheduled to take place in May at a meeting of the North Jersey section in Newark, was made by Horace E. Riley, chairman of the section. The award, which consists of \$1,000 in cash and a gold medal, is to be made biennially to an American chemist under 40 years of age, in recognition of accomplishments in pure or industrial chemistry.

Outstanding achievement in the fields of heat transmission, diffusion, distillation, and high-pressure synthetic chemistry is cited in the decision resulting in the award to Dr. Gilliland. Former assistant rubber director, Dr. Gilliland is an advocate of the maintenance of a post-war synthetic rubber industry in the United States, regarding action for this purpose as essential to the national welfare.

A native of Oklahoma, where he was born on July 10, 1909, in El Reno, the medalist received the degree of bachelor of science from the University of Illinois in 1930, the master's degree from Pennsylvania State College in 1931, and the degree of doctor of science from the Institute in 1933. He joined the Institute's teaching staff in the next year, and became a full professor in 1944. He is the author of numerous scientific papers.

The award of which Dr. Gilliland is the first recipient was established to commemorate the technical and industrial accomplishments of Dr. Baekeland, one of the foremost research chemists of his time, who is best known for the invention of bakelite, the first commercial synthetic resin. The development of synthetic resins, commonly known as plastics, which has eventuated since Dr. Baekeland's pioneering invention has had notable influence on modern civilization. Dr. Baekeland's death at the age of 80 occurred on February 23, 1944.



## Food and Thought

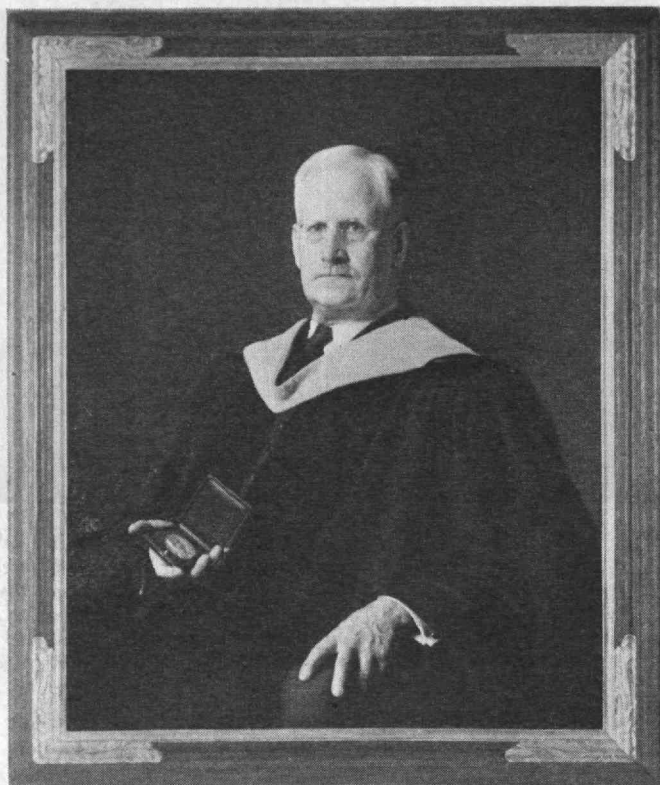
**H**OLDING its 242d meeting on the last Monday in January at Walker Memorial, the Alumni Council was greeted by Dr. Compton, acted on numerous reports, and heard two speakers discussing topics of immediate interest. Raymond Stevens, '17, President of the Alumni Association, presided; 85 members and guests were in attendance. Among the numerous items presented in the report of Charles E. Locke, '96, Secretary of the Alumni Association, was the slate of officers named for election by the National Nominating Committee of the Association, which is detailed elsewhere in this issue of *The Review*. Josiah D. Crosby, '21, chairman of Alumni Day 1945, scheduled for June 23, reported members of subcommittees as follows: *Class Day*, Eugene Mirabelli, '19; *dinner*, Donald G. Morse, '21, Larcom Randall, '21, Roger T. Coffey, '34, and Frank P. Wilkins, '35; *publicity*, Henry B. Kane, '24, James Donovan, '28, George I. Chatfield, '28, and F. G. Fassett, Jr., and John J. Rowlands, staff; *ways and means*, Carl M. F. Peterson, '29, and Delbert L. Rhind, staff. Plans for the annual event are progressing in good fashion, Mr. Crosby stated.

The Alumni Fund, Director Henry B. Kane, '24, reported, showed as of January 29 encouraging advances over the final totals for last year, both in contributors and in contributions. The 9,389 contributors represented at the end of January were about 500 more than for the previous year, and their contributions of \$129,486.12 exceeded by some \$14,000 the total contributed that year.

The first speaker introduced by President Stevens was Ernest T. Larson, a graduate of the University of Pittsburgh, now enrolled as a graduate student in physics at Technology. Describing the life of the Institute's Graduate School, Mr. Larson commented pungently on the



Captain Charles S. Joyce, United States Navy (Retired), senior naval officer at the Institute, who was detached from active duty on February 1. He was succeeded as senior naval officer by Captain Roswell H. Blair, United States Navy.



M.I.T. Photo

In commemoration of the 50th anniversary of their graduation and his 40th year as class secretary, members of the Class of 1894 have presented to the Institute this portrait of Samuel Cate Prescott, who was head of the Department of Biology and Public Health from 1921 to 1942 and dean of the School of Science from 1932 until 1942, when he retired. The artist is H. Bingham Ballou.

many changes which war has meant, citing the present enrollment of about 350 graduate students as compared with the 760 of 1940, and the decline of graduate students in physics from 54 in 1940 to 16 at present, of whom only about a third are full-time students. Despite shrinkage in numbers, diversion of Faculty members to war research, and general dislocation of the peacetime program of colloquia and similar activities, Mr. Larson showed, the spirit of the graduate student and of the Graduate School continues good, and effective work is being done as a consequence.

President Compton in bringing the Council the greetings of the Institute surveyed high spots in recent and continuing work of the administration. The problems involved in stabilization of enrollment once the war is past, in the increased number of students from foreign countries, and in the establishment of a suitable program for men returned from the armed services, he explained, are occasioning much study. Likewise the question of reallocation of space, necessarily closely related to the first and third of these problems, is under discussion. The Institute continues to recognize and grasp opportunities to broaden its service, Dr. Compton said, pointing out that the most recent such action is the establishment of a Department of Food Technology, with Professor William L. Campbell, '15, as head and Professor Bernard E. Proctor, '23, director of the Samuel Cate Prescott Laboratories, in charge of research.

Final speaker of the evening was Professor Proctor, who discussed salient topics from the wide field of food research as war emphasizes its (Concluded on page 334)



## Thank you for the ammunition, Paul Revere!

Paul Revere cherished freedom above all else, and fought determinedly for it, both in the field and in his factory. He knew that only men free from domination could create a great country, grow with it, be rewarded according to their abilities. In this land's struggle for release, a need developed for cannon; Paul Revere cast many, and to give them voice, made gunpowder. Thus this liberty-loving man turned his skills to war, to help preserve the right of us all to enjoy the fruits of our work.

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brass, but bronze, steel, aluminum and magnesium. This is a war of men and metals, power and powder, to preserve us as the greatest, most prosperous, most creative and happy people on earth, because we are the most free.

The day will come when victory is won. Once again the spirit of Paul Revere will count well-spent the long, arduous hours in mill and factory, turning out millions upon millions of pounds of metals. Once again new methods, qualities and characteristics, developed to meet the needs of war, will be turned to the advantage of commercial products. In developing your postwar plans for the use of copper and its alloys or the amazing light metals it will pay you to draw upon the accumulated and modern knowledge of our country's oldest metal-working company. Just write the Revere Executive Offices, 230 Park Avenue, New York 17, N. Y.

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## REPORT FOR THE YEAR 1944

Principal repayments during the year exceeded new loans made by *over fourfold*, and 1,572 men — over 60% of the 2,584 receiving loans since the Fund was established in 1930 — had completely discharged their financial indebtedness by December 31, 1944. Many of these 1,572 and others as well, had taken advantage of the provision that "payments may be anticipated," for \$78,703.08 of notes were paid off during 1944 *in advance of maturity*.

Such co-operation is especially appreciated in these times because it has enabled the Loan Fund Board to continue to bear the cost of insurance protection on all outstanding obligations despite the markedly higher "war risk" premium rates occasioned by men in the military or naval services.

The data given below summarize the Fund's transactions during 1944 together with the cumulative figures for the past fourteen years:

### THE TECHNOLOGY LOAN FUND BOARD

K. T. Compton

H. S. Ford

B. A. Thresher

D. L. Rhind, *Secretary*

H. E. Lobdell, *Chairman*

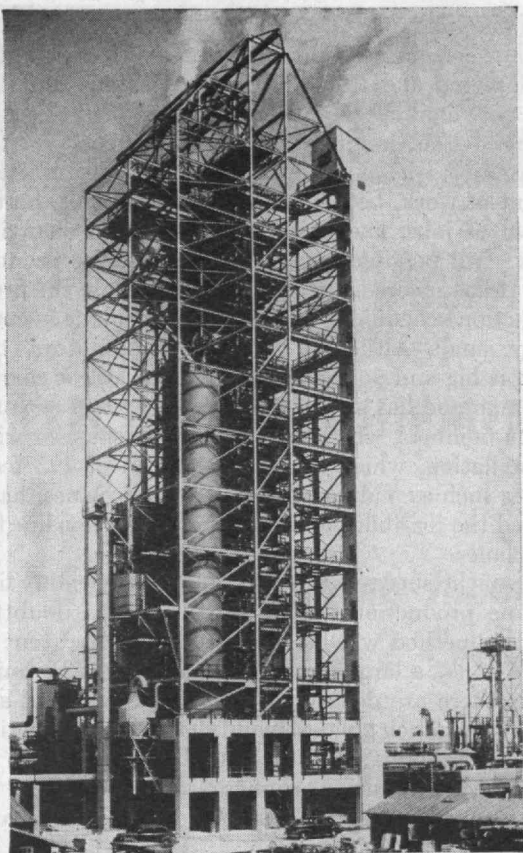
*Cambridge*

*February 1, 1945*

Cumulative Record of the Technology Loan Fund from its establishment in 1930 up to December 31, 1944, and the corresponding figures up to December 31, 1943, together with the net changes during 1944.

	<i>At Dec. 31 1943</i>	<i>At Dec. 31 1944</i>	<i>Net Changes during 1944</i>
<b>ITEMS OF OUTGO</b>			
Number of men receiving loans . . . . .	2,507	2,584	+77
Total amount loaned . . . . .	\$1,862,925.75	\$1,881,865.75	+\$18,940.00
Average per capita loan . . . . .	\$729.33	\$728.27	-\$1.06
<b>ITEMS OF INCOME</b>			
Number of men whose indebtedness has been completely discharged . . . . .	1,361	1,572	+211
Principal repayments <i>in advance</i> . . . . .	\$346,673.79	\$425,376.87	+\$78,703.08
Other principal repayments . . . . .	\$772,602.97	\$854,655.47	+\$82,052.50
Total principal repayments . . . . .	\$1,119,276.76	\$1,280,032.34	+\$160,755.58
Total principal matured, considering "advance repayments" as matured when paid . . . . .	\$1,169,149.99	\$1,321,421.22	+\$152,271.23
<b>Collection Ratio, i.e. percentage of total maturities paid.</b> . . . .	<b>95.7%</b>	<b>96.9%</b>	<b>+1.2%</b>
Matured principal in arrears . . . . .	\$47,475.88	\$38,991.53	-\$8,484.35
Actual "written off" accounts . . . . .	2,397.35*	2,397.35*	(no change)
Total maturities unpaid . . . . .	\$49,873.23	\$41,388.88	-\$8,484.35
Interest received . . . . .	\$173,266.47	\$187,734.33	+\$14,467.86
NOTES OUTSTANDING . . . . .	\$741,251.64	\$599,436.06	-\$141,815.58

\* Of seven men, deceased prior to 1938, and not covered by insurance.



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In complete refinery operation, Naphtha Polyform . . . a process that raises the octane of heavy naphtha and utilizes refinery propanes and butanes for further enhancing the yields and octane level of motor gasoline — forms an excellent team with TCC for the production of premium motor gasoline.

For high yields of high viscosity index, low pour lubricating oils, Lummus offers, as in high octane motor gasoline, a wealth of experience in Propane Deasphalting, Vac-

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uum Distillation, Furfural Refining, Benzol-Ketone Dewaxing and Clay Finishing. Lummus has built a large proportion of the world's solvent lubricating oil refining capacity—fourteen solvent refining plants . . . nineteen solvent dewaxing units . . . including complete lubricating oil refineries.

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# LUMMUS

## PETROLEUM REFINING PLANTS



## LIGHTNING ASSEMBLY

*(Continued from page 304)*

At the present time, the various major assemblies of the P-38 are produced in outlying plants or by other companies. Before entering the moving assembly line, the center section is delivered and placed in a "premate" line, where the fuselage is attached. Then the control cables are strung and tested under tension to see that they ride the pulleys without any friction on the sides. This early installation of the control cables permits inspection of them and the closing of the main beam. This, in turn, allows the early installation of gasoline tanks and other assemblies which, after they are installed, prohibit proper inspection of the cables. From the premate line, the center section with its fuselage is hoisted into place in the mating jigs. The purpose of these jigs is to permit drilling of holes and the attachment of the two booms and *empennage*. All of these units are delivered to the assembly line as nearly complete as possible.

The wings and motors are hoisted into position by the overhead crane. All possible installations are made in the first two lines. Propellers are mounted at the beginning of the third line, and the plane is then ready for its preliminary test. Hydraulic equipment is attached to the moving cradle, and pressure is applied to the hydraulic system of the airplane. With simulated flight conditions, the hydraulically controlled landing wheels and nose wheels are lowered and raised, the doors of the wheel wells opened and closed, and the instrument panel and other equipment tested. In a similar manner the oxygen system and electrical systems are checked. No gasoline is

placed in the tanks nor are the motors started until the airplane has been removed from the assembly line. After being completed and tested, the plane is towed to the airport for its final check and flight test.

This method of assembly has proved a success for the Lightning. Costs have been reduced by more efficient assignment of work, better handling of materials, better breakdown of jobs, and easier adjustment to changing schedules — all possible because of the moving production line. It has succeeded with the P-38 because the present production schedule is large and the airplane is comparatively small. Although, with its two motors, the Lightning is big and powerful for a fighter, still it carries only one man and has a wing span of but 52 feet as compared with bombers, which have twice that span, or with the Constellation, which has a wingspread of 123 feet. Companies such as Vultee, with its training planes, have also proved the feasibility of a moving production line for small airplanes.

In spite of the success of the moving final assembly line for airplane production during wartime, it is doubtful whether the method will be used to any great extent in the future unless a large number of ships are to be built. Of course, there are definite possibilities that small airplanes may be in such great demand that mass-production methods can be used. But if the number of planes to be built is low, the resulting savings are not sufficient to justify the space and expense involved in installing and operating a moving line.

It is doubtful whether this type of final assembly will ever be used for large airplanes. The production schedule

*(Concluded on page 314)*



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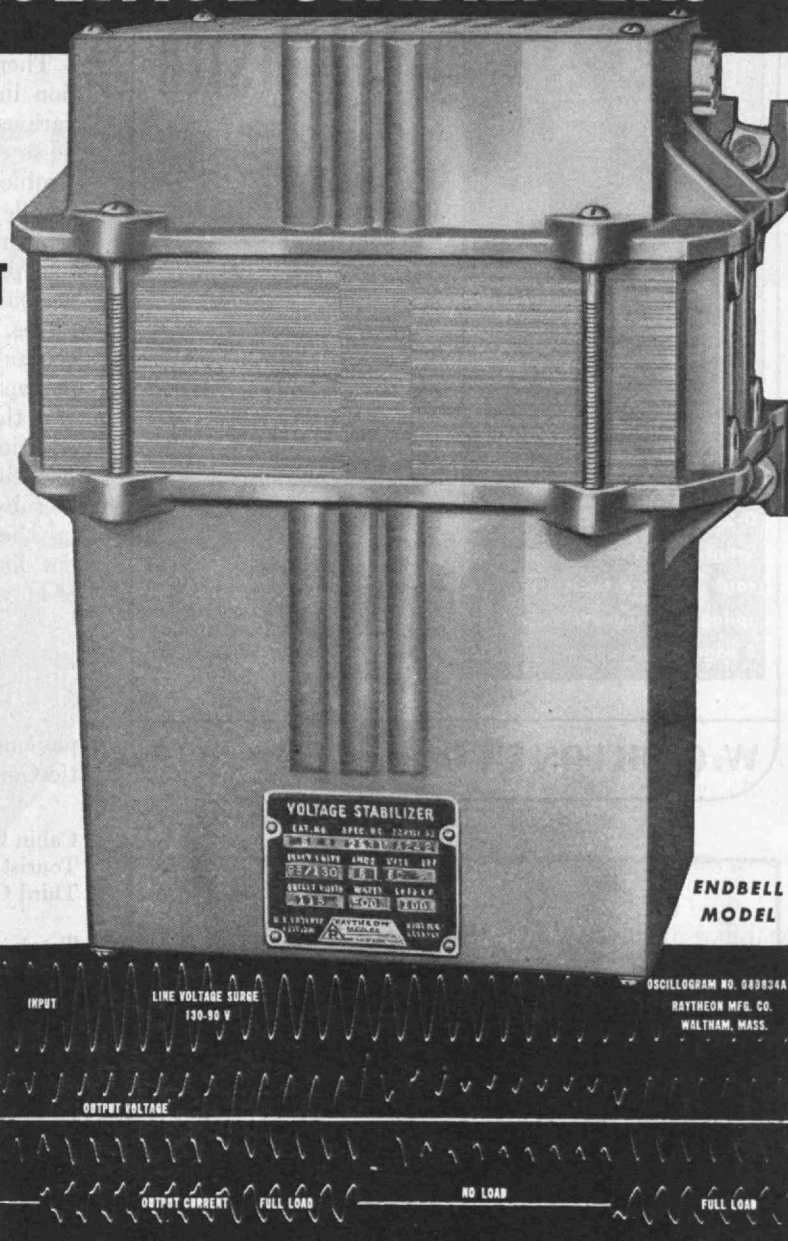
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and their behavior is usually unimportant. Transients resulting from connecting or disconnecting the load require somewhat longer time for recovery. Smaller changes in load cause proportionately smaller transient disturbances in output voltage. This characteristic is shown above.

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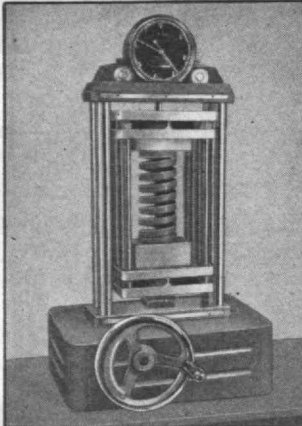
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**BATH, MAINE**

## LIGHTNING ASSEMBLY

(Concluded from page 312)

will undoubtedly remain relatively small for the big ships. The size of the jigs and the necessity for very rigid construction make a moving final assembly line undesirable.

There is little question, however, that moving production lines will have wide application in the future for various subassemblies. Multiple-use production lines will be so designed that units of different models may be assembled. For example, separate production lines could handle center sections, wings, or motors of several models. This possibility is clearly indicated by the present design program. Airplanes are now being designed so that various subassemblies can be produced complete in themselves. This makes it possible simply to "button them together" in final assembly. For the future, this trend is important as it permits greater standardization of design and the application of mass production procedures. In addition to aiding production, the method also aids in the servicing of the airplanes as it allows complete units to be substituted quickly and eliminates the need of grounding the airplane for repairs for long periods of time. Without doubt the airplane industry will expand its utilization of moving assembly lines but in a different form.

## ATLANTIC FLIGHT

(Continued from page 298)

passengers carried by lines represented in the Transatlantic Conference were divided thus:

	<i>Eastbound</i>	<i>Westbound</i>	<i>Total</i>
Cabin Class.....	100,980	101,740	202,720
Tourist Class.....	120,295	136,665	256,960
Third Class.....	153,810	166,676	320,486
Total.....	375,085	405,081	780,166

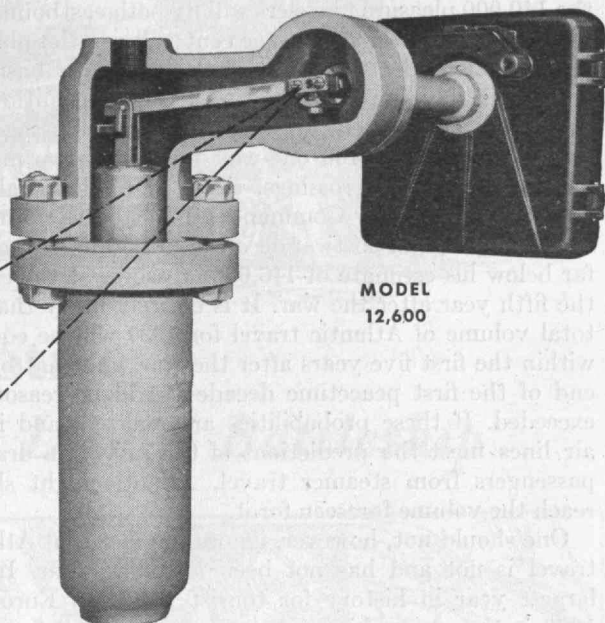
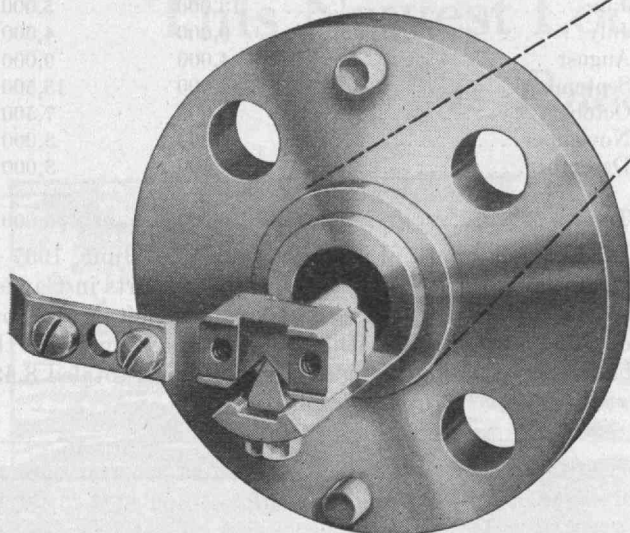
About 30 per cent of cabin-class passengers in 1937 were traveling on business rather than for pleasure. It is reasonable to expect that businessmen will use the fastest mode of transportation available after the war; hence the air lines have a potential 60,000 passengers from the cabin class to start with. There is the encouraging possibility for the air lines, moreover, that the ease and speed of the trip may lead the businessman to make several crossings a year instead of one or two as he used to do.

But these 60,000 passengers are less than one-third the yearly volume reckoned by Commander Johnston for the end of the first decade after the war. The air lines must attract the remaining 140,000 cabin-class passengers and even then dip into the tourist group if they are to meet the estimate. Whether they can expect to draw away from steamer travel the 140,000 cabin-class travelers for pleasure is a question on which some statistical light may be thrown. The majority of these passengers were booked by the travel agents of this country, undoubtedly the greatest single factor in controlling the journeyings of thousands of travelers. Surveying these experts last July, Time, Inc.'s, "Service on Postwar Information" found that they expect European travel in future to be 17 per cent by airplane, 64 per cent by steamship, and 32 per cent by a combination, plane one way, ship one way. Duplicate answers to questionnaires account for the discrepancy in the total.

(Continued on page 316)

# A FINER LIQUID LEVEL CONTROLLER

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- Knife-edge bearing assembly is integral with the seamless steel housing . . . assuring perfect alignment.
- Housing is doweled . . . cannot be reassembled incorrectly . . . eliminates field calibration.
- Knife-edge and bearing are replaceable . . . so designed that incorrect reassembly is impossible.

- Stainless steel knife-edge bearing assembly is standard . . . alloy steels (monel or other alloys available where required).
- Reversible knife-edge bearing has milled guide slots.

The 12,000 Series controllers are available in standard ranges from 14 inches to 15 feet. They meet practically all requirements for level control including interface service and remote level indication. Write, specifying your problems and Masoneilan Engineers will make their recommendations.

## PLUS THESE ADDITIONAL FEATURES

- Torque Tube Assembly designed for high temperatures.
- Over-travel Stops
- Control Mechanism sensitive to .001"
- Left or right-hand case mounting.
- Proportional Band calibrated 1 to 100% over 4" scale.
- Convenient Setting Index Scale.
- Proportional band adjustment without high multiplication.

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REG. U.S. PAT. OFF.

**MASON-NEILAN REGULATOR COMPANY**

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New York, Philadelphia, Pittsburgh, Toledo, Chicago, Tulsa, Atlanta, St. Louis, Houston, Los Angeles, San Francisco, Mason Regulator Co. of Canada, Ltd., Montreal, Canada



## ATLANTIC FLIGHT

(Continued from page 314)

We shall compromise about this discrepancy — to the benefit of the air lines — and assume that 20 per cent of the 140,000 pleasure travelers will fly both eastbound and westbound, and that 33 $\frac{1}{3}$  per cent will use the plane in one direction, the ship in the other. On this basis, air travel will have its nucleus of 60,000 transatlantic business trips augmented by 28,000 pleasure passages on round trips and 23,100 one-way pleasure trips, making a total of 111,100 crossings, a bit more than half the crossings foreseen by Commander Johnston as normal at the end of the first postwar decade, but not discouragingly far below his estimate of 146,000 crossings at the end of the fifth year after the war. It is entirely likely that the total volume of Atlantic travel for 1937 will be equaled within the first five years after the war, and that by the end of the first peacetime decade it will be reasonably exceeded. If these probabilities are realized, and if the air lines meet the predictions of the survey in drawing passengers from steamer travel, Atlantic flight should reach the volume foreseen for it.

One should not, however, ignore the fact that Atlantic travel is not and has not been a stable affair. In the largest year in history for tourist travel to Europe — 1930 — the steamship companies carried in first and cabin classes more than 160,000 passengers in each direction, a total volume in these two classes alone of some 330,000. Four years later, at the low point of the world depression, the number carried in these classes was only

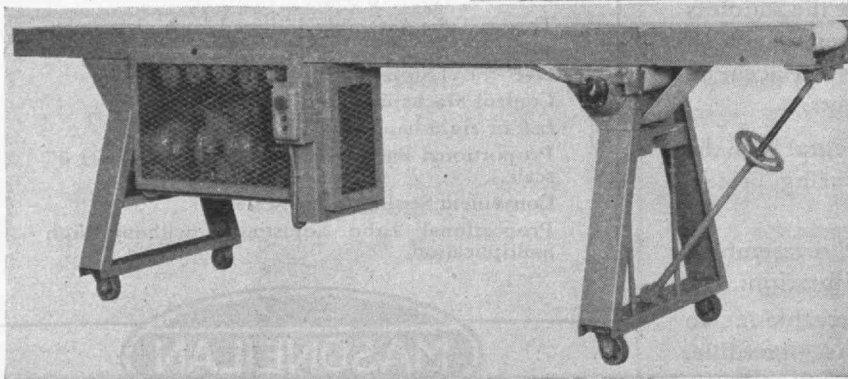
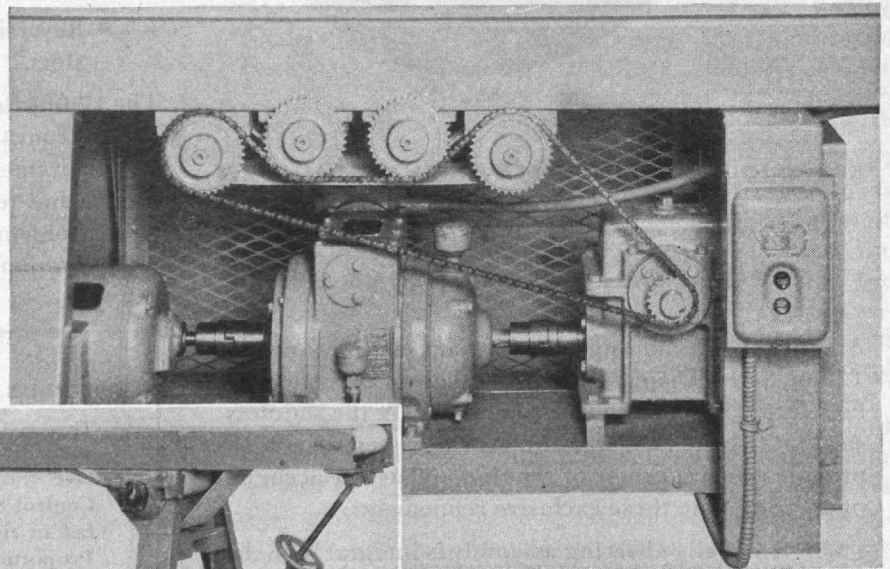
a little over 70,000 in each direction. Another sort of fluctuation must be anticipated also. A vivid analysis of it is possible if we return to the total volume of 111,100 Atlantic air crossings shown as likely by application of the survey percentages to existing statistics. This total volume gives a potential of 52,050 passengers in each direction, which averages just under 4,500 a month if the travel were evenly divided by months. Unfortunately, it is not. According to the way cabin-class Atlantic travel was distributed in 1937, this potential would be divided as follows, in round figures:

	Eastbound	Westbound
January.....	2,000	1,000
February.....	2,000	1,000
March.....	3,000	2,000
April.....	5,000	3,000
May.....	7,000	3,000
June.....	13,000	5,000
July.....	9,000	4,000
August.....	4,000	9,000
September.....	4,000	13,500
October.....	2,000	7,500
November.....	2,000	3,000
December.....	2,000	3,000
Total.....	55,000	55,000

In the peak month of eastbound travel — June, 1937 — steamers carried 23,588 passengers from ports in Canada and the United States. Eight steamers left New York on June 30 that year with 3,316 cabin passengers. In the last week of June, the figure from all ports totaled 8,431  
(Concluded on page 318)

At the right is shown a close-up of a workmanlike, compact and very efficient driving assembly used on the conveyor table unit illustrated below. A No. "5B" WHS Worm Gear Speed Reducer provides the required ratio of reduction.

**WHS SPEED REDUCERS**



Cutter P. Davis, M.I.T. '19, President

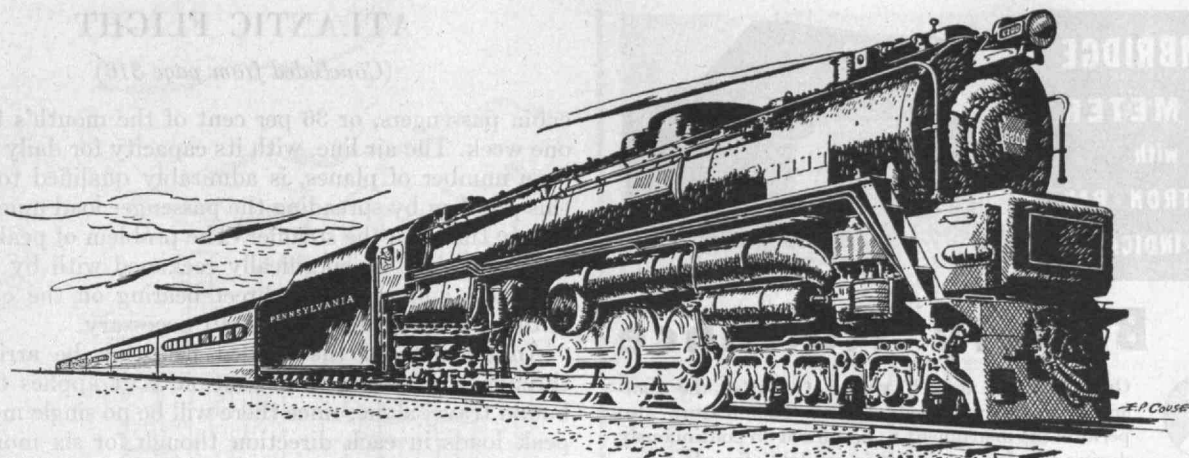
Have you a speed reduction problem? Our experienced engineering staff is at your disposal.

WHS Speed Reducers are manufactured by the "Makers of the First Speed Reducers in America to be Shipped from Stock".



**WINFIELD H. SMITH, Inc.**

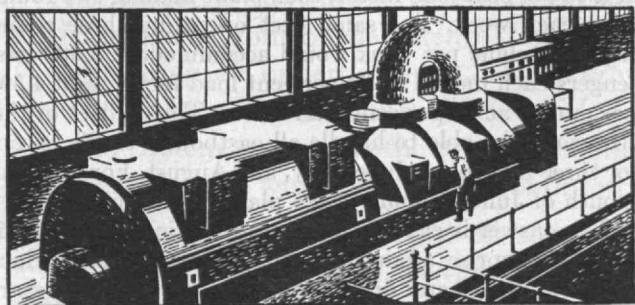
55 MAY STREET...SPRINGVILLE..ERIE COUNTY..NEW YORK



## This Newest Locomotive *is Powered Like a Battleship*



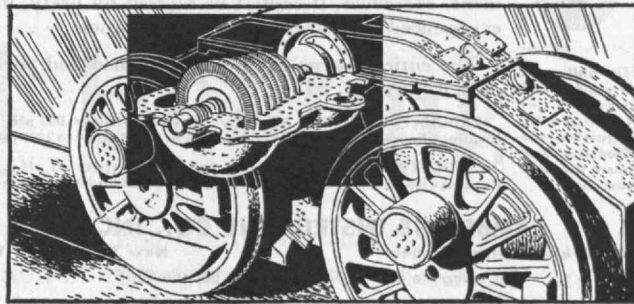
LONG AGO successfully developed by Westinghouse for ocean vessels, the *steam turbine* has now been harnessed as a brand new type of smooth, efficient motive power for modern railroad locomotives.



THE POWER-PACKED locomotive turbine is a descendant of giant Westinghouse turbines which generate much of the electricity used today. The great expansion of electric power began with these turbines.

THE RAILROADS are developing a dazzling new kind of transportation for the future. The latest and most dramatic improvement is *steam turbine* power, which gives the Iron Horse "new lungs."

To help produce this new locomotive, the Pennsylvania Railroad, a long-time pioneer in transportation improvements, turned to Westinghouse and the Baldwin Locomotive Works. Working as a team, these companies have produced this latest in a great line of



THE WESTINGHOUSE steam turbine in the Pennsylvania Railroad's new direct-drive locomotive is *no bigger* than a household electric refrigerator—yet it will haul long passenger trains with ease.



THE VELVETY FLOW of power from this 6,900 horsepower *steam turbine* locomotive will make trains run with extra smoothness and is a major contribution to finer transportation for the future.

steam locomotives—descended from "Old Ironsides," built by Matthias Baldwin in 1832. *Westinghouse Electric & Manufacturing Company, Pittsburgh 30, Pennsylvania.*

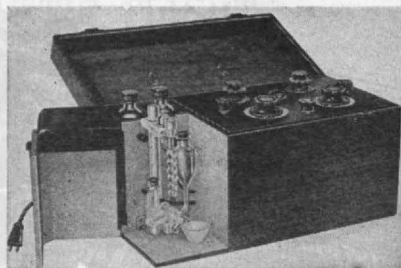
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## CAMBRIDGE pH METER with ELECTRON-RAY NULL-INDICATOR



# No Battery Nuisance



Off Balance - Negative



Balance



Off Balance - Positive

The null-point is quickly and precisely determined by adjusting the Electron-Ray beam to a narrow slit.

Operated from any 110 volt A. C. outlet, the Cambridge is always "ready-to-go." This feature also permits the instrument to be turned on continuously during the day so that it is available for pH measurements immediately without the necessity of waiting through a warm-up period to obtain stability.

An outstanding improvement over the delicate pointer galvanometer usually used in pH Meters is the Cambridge Electron-Ray Null-Indicator. Producing a variable width beam on a fluorescent screen, this null-indicator permits quick hairline adjustment. Moreover, it cannot be injured by hasty, inexperienced or accidental mis-manipulation.

The entire instrument is self-contained and portable, 8 1/2" x 10" x 17 1/2".

LABORATORY MODEL Accuracy .02 pH, Sensitivity .005 pH Readings Reproducible to .01 pH, Range 0 to 14 pH and 0 to 1200 mv.

INDUSTRIAL MODEL Accuracy .05 pH, Sensitivity .01 pH Readings Reproducible to .02 pH, Range 0 to 14 pH and 0 to 1000 mv.

### CAMBRIDGE INSTRUMENT CO., INC.

3732 Grand Central Terminal

New York 17, N. Y.

For complete information, send for Bulletin 910E

## ATLANTIC FLIGHT

(Concluded from page 316)

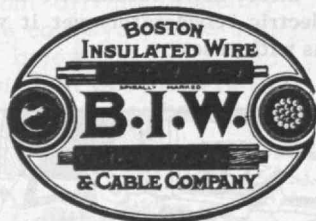
cabin passengers, or 36 per cent of the month's total in one week. The air line, with its capacity for daily service by a number of planes, is admirably qualified to lessen this problem by spreading the passenger load much more evenly than can the steamer. The problem of peak loads, however, must be specifically reckoned with by air-line operators and will have direct bearing on the question of the size of the fleet of aircraft necessary.

An estimate of the needed fleet can be arrived at through considering the situation as it applies to east-bound travel alone, since there will be no single month of peak loads in each direction though for six months of light tourist travel the loads both eastbound and westbound will be reasonably close. A plane accommodating about 50 passengers on a "sit-up" basis can be operated successfully on a schedule of two round trips each week between New York and London and in the peak months on a schedule of three such round trips. Under normal conditions an air line expects a load factor of about 60 per cent; in peak periods it would be higher — say 75 per cent. Here is what various fleets could carry:

Number of Planes	Daily Trips	Monthly Trips	Passengers per Month	Passengers per Month
			60 per cent Capacity	75 per cent Capacity
10	3	80	2,400	3,040
15	4	120	3,600	4,560
20	5	160	4,800	6,080
25	7	200	6,000	7,600

From the distribution of passengers by month according to steamship experience in 1937, it will be seen that a fleet of 10 planes of 50-passenger capacity will handle the potential eastbound traffic for six months of the year at a 60 per cent load factor, each plane making two round trips each week. The same fleet operating three round trips per plane per week would accommodate 3,600 passengers each month at 60 per cent load factor, and 4,500 per month at 75 per cent load factor. Thus a fleet of this size would be able to handle all eastbound traffic except for three months — June, July, and August. For the peak month of June, as many as 25 planes would be needed.

The answer is clearly that transatlantic flight must be a free-enterprise affair, with competing air lines which can pool planes and draw from the pool when necessary to meet peak loadings. Thus would be averted the situation which has confronted steamship lines — idle ships and the cost of maintaining them and holding the crews. Authority should be granted immediately to one or two of the major domestic air lines that have been flying the Atlantic so successfully for the last two years for the Air Transport Command. Such a service would have the benefit of a pool of aircraft in domestic service that could be put into transatlantic service when occasion necessitated. Five ships from two major organizations withdrawn from domestic service for two or three months of a year would not handicap domestic operations and would advance Atlantic flight by permitting the handling of peak loads without increasing costs. A fleet of 15 planes of 50-passenger capacity, handled on this basis, will meet our requirements for at least the first decade after the cessation of hostilities.



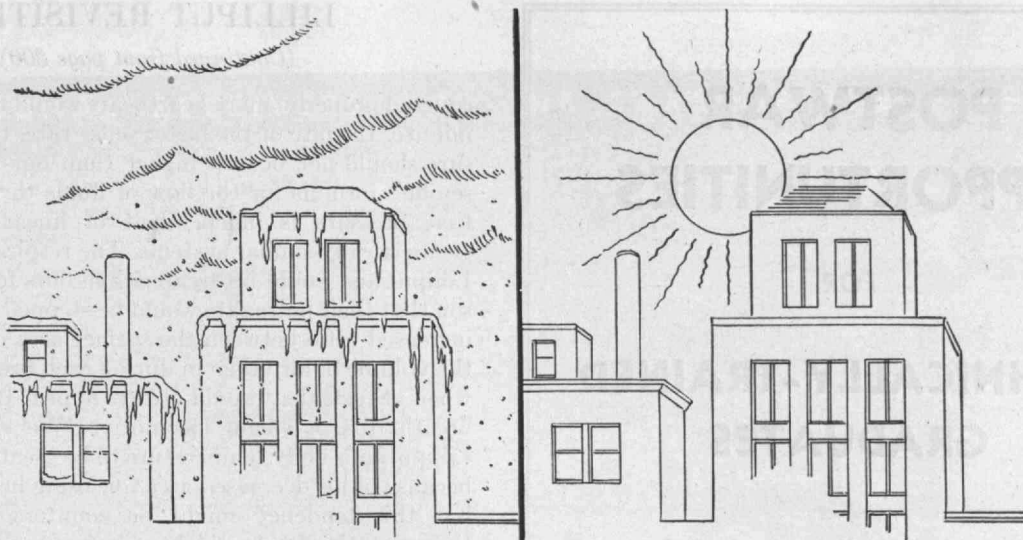
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# Profit by Controlled Heating

Each day's heating requirements for your building differ. One day may be cold, the next day may be warm. There's only one way you can obtain comfortable heat with rationed fuel—by installing a heating system that is automatically controlled.

The Webster Moderator System of Steam Heating is a controlled system. There's no overheating or underheating . . . No costly waste of rationed fuel. With the Webster Moderator System, you receive the correct amount of heat to agree with any weather condition.

Continuous, adequate supply of steam is controlled by an Out-door Thermostat which automatically adjusts the heating rate to agree with changes in outdoor temperatures.

For prompt heating-up, balanced distribution of steam, and even room temperature throughout your building, specify a Webster Moderator System.

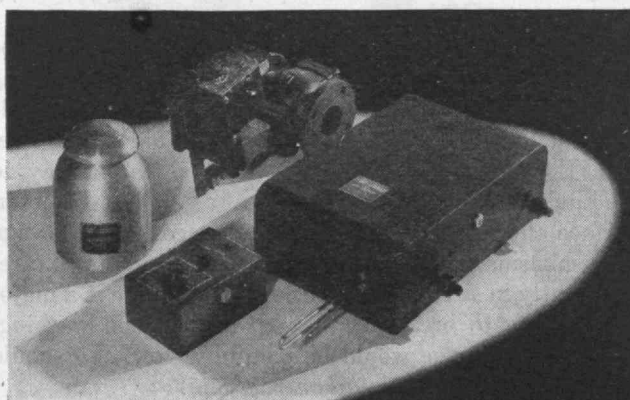
## More Heat with Less Fuel

Webster Engineers have found through thousands of surveys that seven out of ten large buildings in America (many less than ten years old) can get up to 33% more heat out of the fuel consumed.

If you have a problem in heating your building properly, write for "Performance Facts". This free booklet contains case studies of 268 modern steam heating installations and the great savings they are effecting.

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In the Webster Moderator System of Steam Heating there are just four control elements—an Outdoor Thermostat, a Main Steam Control Valve, a manual Variator and a pressure control Cabinet. These controls are an integral part of the Webster System . . . assuring the highest expression of comfort and economy in modern steam heating.

*Fuel Saving  
Starts With  
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**AUTOMATIC**  
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FOR

## TECHNICALLY-TRAINED GRADUATES

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For many years, college men have made careers for themselves with this Company in the departments of Production Management, Chemical Research and Development, Plant Maintenance, and Mechanical Design and Development.

As America's largest manufacturers and processors of soaps, glycerine products, and vegetable fats and oils, this Company operates 29 factory and mill units in the United States and Canada. Each working day these plants produce one million dollars' worth of soap, shortening and oil.

During the past 15 years an average of one factory each year — at home and abroad — has been added. Postwar plans are to continue this growth and to expand Company operations into new factories with new products and far-reaching technical developments.

Procter & Gamble has been built by men coming up through the business. Factory Superintendents generally are young men. The Company believes in developing its main group of executives instead of hiring them from the outside.

We do not wish to distract your attention from your present very important assignment. But when you are ready to return to civilian life, we should like the opportunity to discuss with you the industrial opportunities this Company has to offer.

**PROCTER & GAMBLE**

**INDUSTRIAL RELATIONS DIVISION**

**CINCINNATI 17, OHIO**

## LILLIPUT REVISITED

*(Continued from page 300)*

covered properly, more heartbeats would be required each minute. In spite of the faster pulse rate, their blood pressure should not be any higher than our own, since Poiseuille's formula for the flow of fluids through pipes tells that pressure is independent of linear dimensions in geometrically similar systems. The respiration rate of the Lilliputians would be greater than ours for the same reason that their pulse rate would be stepped up, namely, the increased ratio between the surface area of the lungs and the volume of air taken in during each breath. Thus, even when at rest, they would always appear to be panting for breath, like a steam locomotive. We should expect a Lilliputian's body temperature to be greater than our own because of his decreased area for losing heat by radiation, but this tendency might be counteracted by certain thermostatic glands which are not very well understood, so that one hesitates to predict the relation. Perhaps the next doctor who is cast ashore upon Lilliput will have his clinical thermometer in his pocket.

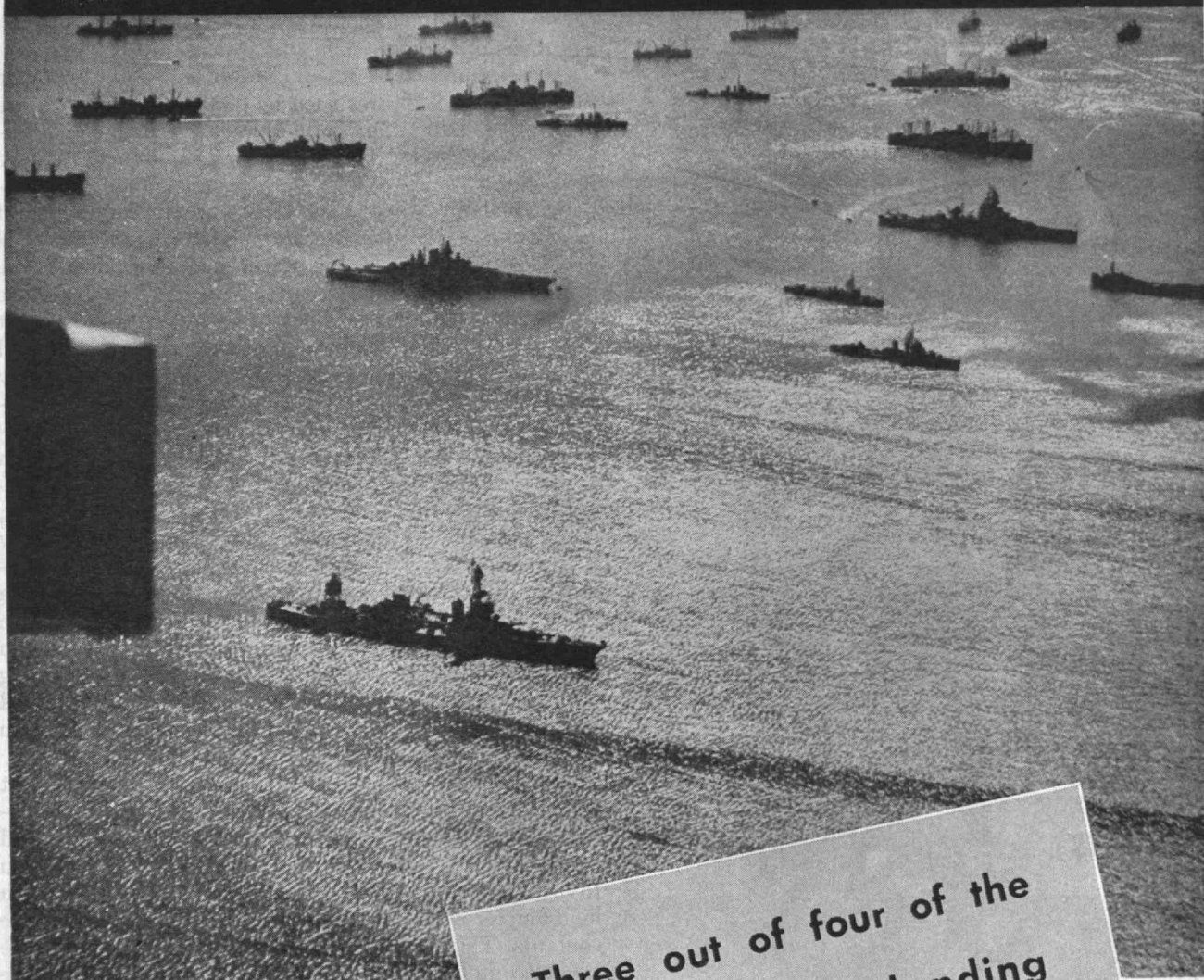
The higher metabolism rate suggested by the accelerated pulse and respiration rates among the Lilliputians should certainly result in a considerably shorter life expectancy. Thus the active, athletic citizen of Lilliput not only must put up with poor eyesight, short wind, and tachycardia but must look forward to a limited life span as well.

Many of the characteristics of the Lilliputians would be reflected in the construction of their homes, although any visitor from our part of the world would, like Gulliver, be able to observe this only by looking in through the windows. If he did, he would find all walls, pillars, and other structural supports much flimsier, even in proportion to their size, than are those to which he was accustomed at home. Conversely, he would find all water pipes and plumbing fixtures proportionately larger in diameter, so that the shape and appearance of things would be quite different. Chairs and tables would stand on spiderlike legs; walls could be practically of cardboard; the layer of paint on them would be inordinately thick in comparison and, having been applied with short strokes of tiny brushes, would seem to reflect light differently. The extreme flimsiness of construction can be explained on the same basis as the increased strength we should expect in the Lilliputians if they are geometrically similar to ourselves. Since a support having one-tenth the cross-sectional area can carry the same relative weight as our structural members, we should not expect a prudent and economical people to construct things any more substantially than considerations of strength and stability dictate.

The water pipes in their buildings would have to be more than one-tenth as large in diameter as corresponding pipes in our buildings, in spite of the general tenfold scale of reduction, because surface tension would tend to restrict the flow of water unduly if the pipes leading, say, to the kitchen sink were only a tenth of an inch in diameter. Surface effects would also require changes in the design of washbasins and bathtubs, for if we reduced our fixtures sufficiently in size, surface tension would make it a major undertaking to break the water surface when washing; moreover, drainage would be painfully slow. We should

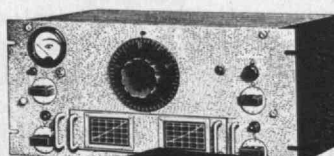
*(Continued on page 322)*

NATIONAL RECEIVERS ARE THE EARS OF THE FLEET

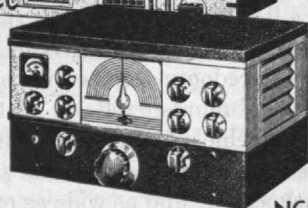


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Three out of four of the  
Navy's ships — landing  
craft or larger — are  
equipped with receivers  
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HRO



NC-200

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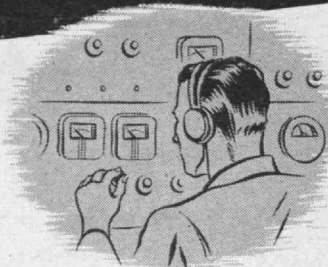
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NATIONAL RECEIVERS ARE IN SERVICE THROUGHOUT THE WORLD

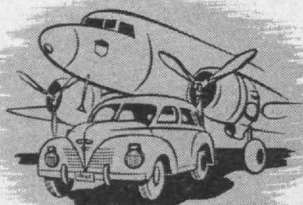


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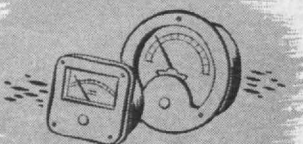
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## LILLIPUT REVISITED

(Continued from page 320)

therefore expect Lilliputian bathtubs and sinks, compared to other household items, to be extra large, with enormous drainpipes.

On account of the general shrinkage of the distance scale, electrical fixtures such as light bulbs and heating coils for the Lilliputians would have to be designed differently from our own. To keep the level of illumination the same in their rooms as in ours, the candle power of Lilliputian light bulbs would have to be cut to a hundredth of what we use. To calculate illumination, one divides the candle power of the source by the square of the distance from source to illuminated surface, and if all distances are reduced by a factor of ten, light intensities must be brought down by a factor of a hundred; otherwise the glare would be overpowering. The candle power of a bulb is fairly proportional to its wattage, so that wattage would likewise be cut to a hundredth of what we require. As a practical consequence, the shape of the filaments in Lilliputian bulbs would have to be changed. If it were not, the Lilliputian bulbs would have one-tenth the resistance of ours, requiring a tenfold voltage reduction if the current density is to be kept at a value that will insure the bulb's longevity. But then the power consumption would be only a tenth of what is required. The solution is to redesign the filament so that its diameter in proportion to its length will be three times that necessary in the corresponding bulb we should use. Simultaneously the potential would be cut to about 10 volts, which is considerably safer than 110 volts anyhow.

The uniform diminution of all distances in Lilliput would inevitably change the rules of etiquette to be observed at the dining-room table. Surface tension would make it almost impossible, for example, for a Lilliputian to drink out of a conical wineglass two-tenths of an inch in diameter without inverting it and sucking out the contents. Thick soups, sauces, and custards would cause similar complications because more would be found on the underside of the spoon than inside it. Moreover, there would be a pronounced tendency for the spoon to pick up the bowl along with the soup, so that the dishes would somehow have to be fastened down.

After having observed these examples of the manner in which a Lilliputian's size affects his home life, let us accompany him when he goes outdoors. In the streets, on the waterways, and in the air we should see a volume of traffic that would remind us of the days before rationing. Automobiles, motorboats, and airplanes would all appear exceedingly popular. Upon inquiry, we should find that all these vehicles are surprisingly inexpensive to operate, even in terms of Lilliputian currency. The reason is the enormous efficiency a body moving through the air or on the water gains when its size is reduced. When air resistance and inertial forces predominate, as with an airplane or automobile, Reynolds' number tells us that a tenfold decrease in the size of a vehicle has the same effect on the air resistance as a reduction in speed by the same ratio. An automobile a tenth as long and as wide as our modern American models could theoretically travel at a speed of several hundred miles per hour before the drag per unit weight would equal that on our own cars traveling at the 35-mile-an-hour limit set by wartime exigencies. Since

(Continued on page 324)

# Helping the sick get well



LAMPS that kill germs . . . X rays to guide the surgeon's fingers . . . operating rooms bathed in glareless light . . . air conditioning to screen out street noises and dust.

Helping the sick get well is only one of the contributions of General Electric. From the research and engineering in G.E.'s laboratories come products to make your work easier, your home brighter, creating new comforts, better jobs.

The pictures you see here are typical of things accomplished for you by G-E research and engineering. General Electric Company, Schenectady, N. Y.

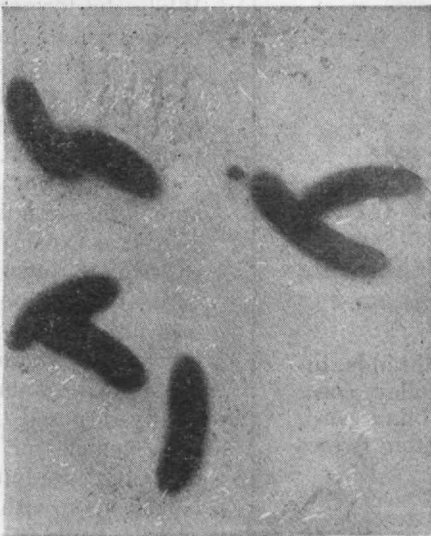


**Mirror of D-Day injury!** How X rays speed treatment of war injuries is shown in this picture of Seaman Brazinski's thigh. On D-Day a German mine shattered his boat, blew him 20 feet in air. Rescued by an LST, rushed to England, X rays quickly defined his injury, permitted accurate setting. Portable G-E

X-ray machines at St. Albans Naval Hospital, L. I., regularly check his progress. Through the skill of doctors 97 per cent of the wounded in this war are saved. The modern form of X-ray tube was invented by Dr. W. D. Coolidge, G-E scientist. X-ray units built by the G.E. X-Ray Corp. are at battlefronts the world over.



**New lamp kills germs . . .** Germ-laden air is purified by the new G-E germicidal lamp. It is already at work in hospitals, in battlefront operating rooms. Tried in a school classroom during a measles epidemic, only one-fourth as many children contracted measles, as compared with unprotected classrooms.



**Seeing the invisible . . .** The electron microscope, more powerful than ordinary microscopes, gives doctors a new tool to fight disease. Here is the germ, *bacillus subtilis*, magnified 8,000 times. G-E engineers are working to make available a portable electron microscope for industry.



**Helps treat Infantile Paralysis . . .** Doctors wanted hot packs to relieve pain and reduce muscular spasms, but such steam packs tended to burn. G-E workers put together a machine for hospital use that produces heated packs that even at 180°F. will not burn the patient's skin.

Hear the G-E radio programs: *The G-E All-girl Orchestra*, Sunday 10 p.m. EWT, NBC—*The World Today* news, Monday through Friday 6:45 p.m. EWT, CBS—*The G-E House Party*, Monday through Friday 4:00 p.m. EWT, CBS.

FOR VICTORY—BUY AND HOLD WAR BONDS

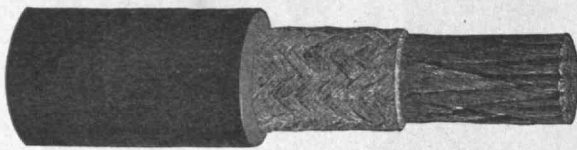
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Our extra quality sash cord, distinguished at a glance by our trade-mark, the colored spots. Especially well known as the most durable material for hanging windows, for which use it has been specified by architects for more than half a century.

## LILLIPUT REVISITED

*(Continued from page 322)*

such high speeds would not be either safe or practical in a country where the largest cities would not be more than a mile long, we should expect normal travel to involve a very low cost per mile.

For water transportation, economy would also be gained, although not to the same extent, because here Froude's number applies rather than Reynolds'. From it we find that the reduction in a ship's length must be balanced by a proportional reduction in the square of the speed if the water resistance per pound is to be the same. If turbulence limits the speed of one of our cargo ships to 12 knots, a similarly designed Lilliputian freighter would be held down to about four knots. Effectively, this represents a threefold gain in top speed if we consider it in terms of ship lengths per unit time.

Because Reynolds' numbers and Froude's numbers would generally be different, we should expect Lilliputian vehicles and craft to exhibit considerably less streamlining than our own. Automobiles would need almost none, because streamlining cuts down air resistance only after turbulence is reached, and an impractically high speed would be necessary to reach it. Here autos would tend to remind us of Model T Fords. Ships and aircraft would probably require a reasonable degree of streamlining, but it would not have to be carried to the extent that we find necessary.

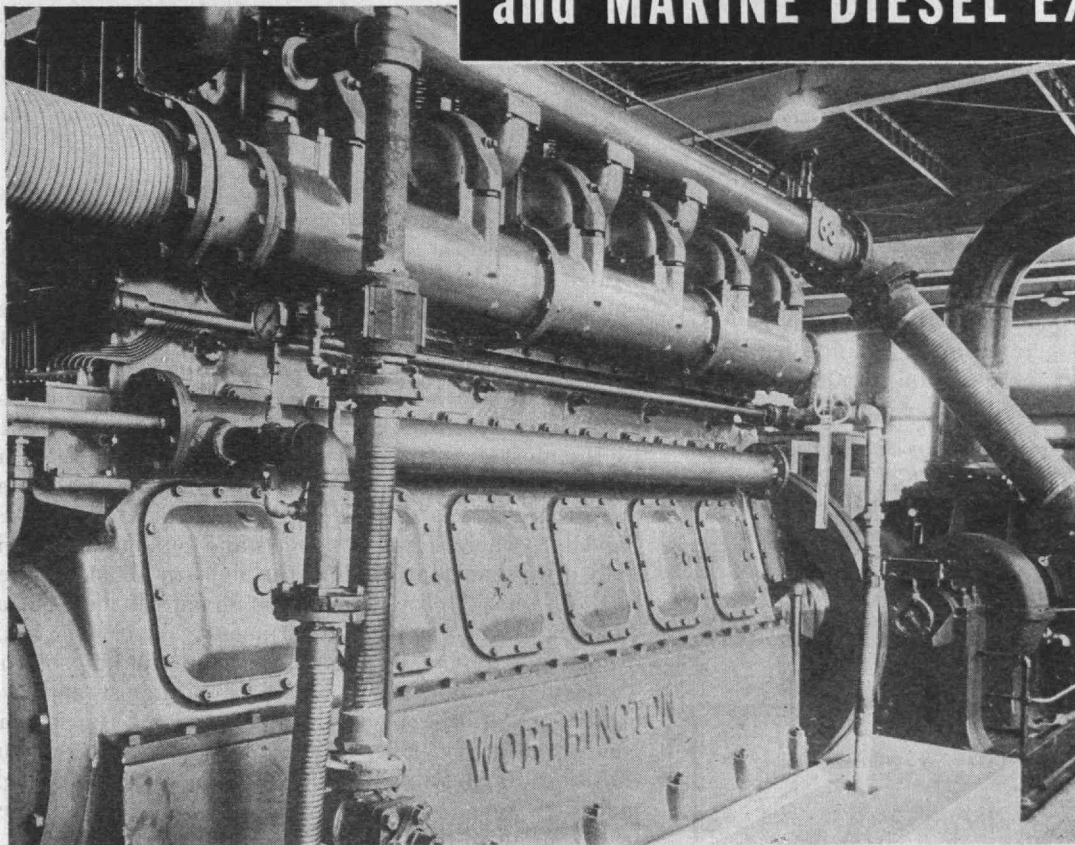
These are just a few of the observations we should expect a modern explorer to report after visiting Lilliput. If he then were to travel to Brobdingnag, as Gulliver did two centuries ago, he would find the inhabitants considerably different from his former hosts, even in other respects than size. While the Lilliputians were amazingly strong, the Brobdingnagians would be pitifully weak. While the former were quick and energetic, with high-pitched voices and fluttering hearts, the latter would be slow and lethargic, with deep, resonant voices and acute vision. Whereas the buildings and furniture of the former rested on thin, flimsy supports, the corresponding structures of the latter, in order to stay up at all, would have to rest on bases that are massive and clumsy. Transportation among the Brobdingnagians would be slow and lumbering as well as expensive. Life for them would be much different from our own and even more unlike the Lilliputians'.

Swift's purpose, of course, in writing *Gulliver's Travels* was not to demonstrate the relations that must exist between a dynamic model and its prototype, nor was it to entertain young children. Swift, who was never very kindly disposed toward the human race, used the book as a vehicle for demonstrating how petty and inconsequential are human beings and their institutions when looked upon with proper detachment. From our present equally imaginary visits, we too can reach some philosophical conclusions, but ours need not be so cynical or misanthropic as Swift's. Examining the modes of life that the inhabitants of his hypothetical territories would be forced to adopt, it should not take us long to decide that we are better off as we are. We do not envy the Lilliputians their poor vision, unpleasant voices, clumsy eating habits, or short life spans. Neither do we see any advantage in being as large as the Brobdingnagians if at the same time we must be as weak and as slow moving.

*(Concluded on page 326)*

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## LILLIPUT REVISITED

(Concluded from page 324)

It is said that the best way to appreciate one's own country is to leave it for a while. If we could, like Gulliver, make trips to lands where the people are much larger or much smaller than we are, we would surely conclude that the human race, in spite of its many faults, is dimensionally well adapted to its environment. From this standpoint if from no other we should affirm the contention of Leibnitz, so ridiculed in Voltaire's *Candide*, that this is the best of all possible worlds.

## THE OPENING ROAD

(Continued from page 302)

at times almost insuperable, and to meet them very careful planning and handling were required.

The delivery of steel to the site of the Tamazulapa Bridge in southern Guatemala is a good illustration of one sort of difficulty. This bridge is an I-bar suspension structure, with a suspended span of 240 feet, and is 489 feet out to out of anchorages, requiring approximately 300 tons of steel with necessary erection equipment and accessories. This material was forwarded to the bridgesite by the most direct practicable route: It was unloaded at Puerto Barrios on the Caribbean side of Guatemala; from there it was shipped by train to Santa Lucia, El Salvador, where it was unloaded and put on trucks; finally it was hauled back along the highway about 45 miles to the Tamazulapa River in Guatemala. All the Central American countries have government control over both export and import shipments, and the handling of the Tamazulapa shipments involved three import and two export operations. The unloading at Santa Lucia was conducted under police surveillance to assure the authorities of El Salvador that the materials, although unloaded from the train in El Salvador, would in fact be taken out of the country.

In the case of shipments for the double suspension bridge at Choluteca, Honduras, all steel and equipment had to be unloaded by ship's tackle into open barges in the Amapala roadstead, towed about 36 miles to the mainland port of San Lorenzo, unloaded, and hauled by truck or bull cart about 26 miles to the bridgesite. Owing to the difficulties of handling, all pieces except the six tower footing sections were kept within three short tons. Even the

(Continued on page 328)

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WHERE  
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IS STILL A CRAFT

## THE OPENING ROAD

*(Continued from page 326)*

cable reels were under this figure. Further, because the barges available at Amapala could not handle more than a limited tonnage, arrangements had to be made to ship from New York each week selected members weighing a total of the barge capacity. These consignments generally had to be transhipped at the Canal Zone to a west coast freighter. In spite of good planning, fast and slow ships broke up the schedule, and the uncertain and irregular northbound sailings on the west coast further disarranged shipments, so that on two occasions too much tonnage arrived at Amapala in one lot. That meant screening the material as it came out of the hold, putting small stuff in one barge and heavy stuff in another, towing the light stuff to the beach, and unloading it by main force and awkwardness, using men wading alongside. The barge thus released went back to the ship for a load of heavy members to be taken direct to San Lorenzo. Finally, the material and bridge members on the beach were reloaded on barges and sent to the mainland. But this system required two round trips of the entire barge fleet at the port. Nowhere after leaving shipside were lifts available until the bridgesite was reached, and stiffeys with hand windlasses or jacks and rollers were used to handle the heavier pieces at San Lorenzo. All this maneuvering was due to the inaccessibility of the bridgesite, the absence of local facilities, and the unusual nature of the work for these localities. The structure is 1,088 feet, out to out of masonry anchorages, and consists of double suspended spans fixed on the central tower saddle, with unloaded backstays. The suspension system is open cables.

The bridge program on the highway project has been particularly interesting in the large variety of types and design used. There are three suspension bridges, two three-span continuous-deck truss bridges, one three-span continuous through truss, and a variety of multiple-span simple truss bridges and single-span bowstring trusses. There is a spun and wrapped cable suspension over the Chiriquí River in western Panama 787 feet over all. In masonry, there are many cut-stone arches up to 30-foot spans, smaller structures with squared stone rubble abutments and reinforced concrete decks, and an assortment of arched culverts in cut-stone masonry.

Difficulties of transportation and access are likely to persist through much of the program of construction. Long sections of the routes in both Central and South America can be reached only at one end as construction starts. To expedite construction in Nicaragua and Costa Rica, it has been necessary to build access roads to reach a distant point on a project so as to provide at least two working heads. In Bolivia, a much needed route can at present be reached by modern ground transportation only at one end of a 500-kilometer section.

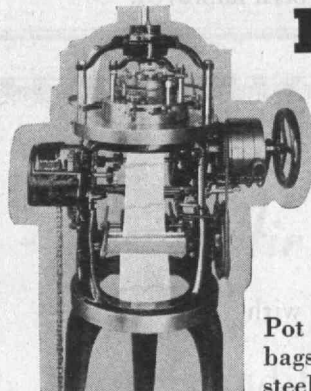
The absence of local supplies, equipment, and materials, and the necessity of importing all such items add both to the difficulties of management and to costs. After Pearl Harbor, the procurement of equipment in the United States was increasingly difficult, and bottoms for west coast cargo were most difficult to get. At one time in the winter of 1942-1943, 9,000 ship tons of equipment, materials, and supplies had accumulated on the wharves at Long Beach, Calif. Many operators throughout Latin

*(Concluded on page 330)*

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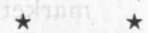
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## THE OPENING ROAD

(Concluded from page 328)

America during the war years have learned regretfully that servicing equipment is more than usually difficult and is easily slighted; in consequence, equipment rapidly deteriorates. They have learned also that it generally does not pay, unless one may write off a heavy charge to the account of the current emergency, to send reconditioned or secondhand equipment to jobs so remote and so isolated as much Latin American work must be for some time. These very conditions, however, merely emphasize the imperative need for improved and extended internal overland communications throughout the whole territory.

The Inter-American Highway when completed will provide the stem connecting the widespread system of Federal Aid roads of the United States with the Pan American Highway system of South America, and thus connect all the national road systems of the several countries. The Inter-American Highway movement has furnished the background and has been the incentive for most of the road construction carried on during the last 15 years throughout the southern continent. Modern road construction was started on a national scale in Argentina in 1933, and in Peru and Chile soon afterward. Brazil has an elaborate program that will ultimately, with future necessary modifications, provide a system of roads comparable doubtless to that of the United States. Colombia began to work toward a definite system in 1930 with the activities of the Consejo Nacional de Vias.

Uruguay is now vigorously attempting to provide specific funds to make autonomous and to support the operations of a highway department which was established some years ago but which has seriously lacked needed assured financing. All these countries have constructed a considerable mileage on those roads which compose the Pan American Highway system, defined as a net of connecting motor roads to the capitals of all the republics. Progress in Colombia, Peru, Chile, and Argentina has been steady and has now reached such proportions that the promise of future construction is excellent and it is to be expected that, with the reopening of the motor vehicle trade, a greatly augmented program of annual construction will undoubtedly result.

Road building will in effect furnish a new industry for these countries. The demands of construction and maintenance will absorb a great deal of any surplus labor that may exist, and the industry will not be internationally competitive. In fact, this industry will create a greater demand for American machinery and supplies. If the United States finds it of national advantage to assist in rehabilitation operations in Latin America to cushion the cessation of wartime production and sustain the internal economies of the American republics, no more promising field can be found than that of road building. With the extension of mileage and the improvement of internal communications, local industry and agriculture will expand, and doubtless the same general economic benefits will accrue to the Latin American countries which have been so strikingly demonstrated as the highways of our own country have been improved.

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(Concluded from page 296)

to obtain, were very fragile, and deteriorated so rapidly in use that new ones had to be bought practically every two years. Prior to the war, millions of glass eyes were imported from Germany and France, whose artisans alone were skilled enough to create a good imitation. That source is now almost entirely lost. American makers could not possibly supply the demand for the best.

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## THE INSTITUTE GAZETTE

(Concluded from page 308)

importance. Drawing upon his experience as consultant to the Quartermaster Corps, Professor Proctor described some of the difficulties imposed upon the preparation and preservation of foodstuffs by the wide ranges of climate and the varied forms of transportation which war involves. Temperatures vary from 120 degrees F. to 60 degrees below zero. Humidity ranges from absolute aridity to total immersion. Yet the Army has progressed notably toward its goal of better stability, palatability, and nutritiousness, with the added factor of compactness and acceptability to the individual. Using over 40,000,000 pounds of food daily, the Army has relied heavily on research to assure quality in that food. Showing samples of the various rations which have eventuated, Professor Proctor explained the nutritive content of each and described the different systems of packaging illustrated.

### Appointed

**JOSEPH C. BOYCE**, who has been a member of the staff of the Institute's Department of Physics since 1931, has been appointed professor of physics and chair-

man of the department of physics of the college of engineering at New York University. Dr. Boyce was active in the Physics Department of the Institute until 1941 when he turned his activities to research for the war effort. Since that time he has been technical aide and section chief of the National Defense Research Committee of the Office of Scientific Research and Development.

During his career at the Institute, Dr. Boyce was engaged in research on the spectroscope, especially in the ultraviolet section of the spectrum. He was a member of the Harvard-M.I.T. eclipse expedition to the Soviet Union in 1936 and has traveled extensively in England and Europe.

Dr. Boyce was graduated from Princeton in 1922 and received his degree of doctor of philosophy from that institution in 1926. He also studied at the Universities of London and of Cambridge. He was research associate in physics at Princeton from 1929 to 1931 and both there and at M.I.T. collaborated with President Compton on spectrographic research. He is a research associate of the Carnegie Institution of Washington, a fellow of the American Physical Society and of the American Association for the Advancement of Science, a member of the American Astronomical Society, a fellow of the Royal Astronomical Society, a member of the editorial board of the *Review of Scientific Instruments*, and a member of the Princeton Club of New York and the Cosmos Club of Washington.



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**The Navy (as this goes to press) is looking for Seabees and experienced Health Officers.**

**All M.I.T. men doing work essential to the war effort are urged to continue with their present employers.**

### **PLACEMENT BUREAU**

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY**

**CAMBRIDGE 39, MASS.**

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**AN AID TO ALUMNI IN FINDING DESIRABLE POSITIONS**

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# TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND — ITS PROBLEMS AND GROWTH

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## In the Mailbag

» As the fifth year of our Alumni Fund draws to a close, more than 9,500 Alumni have given their active support. Almost 700 more than last year and 1,700 more than the first year's total, this figure is evidence that our annual program of giving to Technology is now firmly established.

» One interesting factor is the participation of Alumni in the services. While 28 per cent of our civilian Alumni have contributed, 32 per cent of those in uniform have given this year — one out of three. Why the differential? Well, it's difficult to generalize. Maybe some of these excerpts from letters will give a clue.

*From an Engineers captain in the South Pacific:*

"Enclosed please find two money orders for \$200 as my contribution to the M.I.T. Alumni Fund for 1944-45. M.I.T. thought enough of me to give me scholarships. I must confess I felt it was money wasted for a few years. Now that the schooling is paying off, I feel that the school is entitled to dividends of a sort."

*From a Boston law firm:*

"At the request of Corporal — '40, we are enclosing herewith his subscription to the M.I.T. Alumni Fund in the amount of \$150 together with check in payment thereof. We thought you would be interested to know that this request for payment was sent to us by Corporal — from the battle front in France."

*From an Engineers captain in Italy:*

"It has recently come to my attention that my contribution to the Alumni Fund was only five dollars. Enclosed find check for \$20 further contribution. There is no special assignment for the donation."

*From a Marine Corps private:*

"I am one of the 30 former students of M.I.T. who joined the Marines and were sent to Cornell to continue our education. Since M.I.T. will always be my real alma mater, I'm only too glad to back it up even in my small way, because it is absolutely the finest institution for

higher education in the country. We don't make much as privates, but I guess a little is better than nothing, so please find enclosed a check for seven dollars."

*From the mother of an Army Air Forces private in China:*

"My son, a former student at M.I.T. who is now with the Army Air Forces in China, has asked me to send the enclosed contribution to the M.I.T. Alumni Fund."

*From a Navy lieutenant in the South Pacific:*

"May I tender my apology for my laxness in keeping up with Alumni affairs since leaving Technology in 1939. For the past three years and better I have been quite thoroughly embroiled in the war and for almost two years have been flying with this squadron aboard the most battle-scarred carrier in the Pacific. It has been in the past month only, since returning aboard ship after being shot down at Truk and rescued by a submarine, that a few Technology Reviews have come through to me. I have read them with great interest and note a need for contributions to the Alumni Fund; I am enclosing \$25."

*From a Navy ensign in Florida:*

"Although I was a graduate student for only one year at M.I.T., I hope to come back ere long and finish up an unfinished Ph.D. I am happy to send this sum and wish it could be more, as I have a high regard for the school and the work given me there."



# TECHNOLOGY MEN IN ACTION

## M.I.T. MEN AT WAR

Up to February 12 over 7,207 Institute Alumni, including 30 Admirals, 4 Commodores, and 83 Generals, were recorded as being in the active naval or military services of the United Nations. Among the new additions this month are Rear Adm. Arthur C. Miles '20, Rear Adm. Donald Royce '20, Commo. Paul E. Pihl '24, Commo. Henry A. Schade '28, and Commo. Thomas S. Combs '32. There were 133 Alumni who had been decorated, and 103 who had made the supreme sacrifice.

Additions and corrections to the listings which have previously appeared, beginning with the issue of November, 1942, will continue to be published in future issues of The Review. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

### NEW DECORATIONS

- 1924 Doolittle, James H., *Lt. Gen.*, U.S.A., Gold Star—in lieu of second Distinguished Service Medal for meritorious service as commander of a task group in operation against the Japanese.
- 1926 Mattson, Robert E., *Col.*, U.S.A., Legion of Merit.
- 1932 Combs, Thomas S., *Commo.*, U.S.N., Legion of Merit.
- 1940 Pieczentkowski, Herman A., *Lt. Comdr.*, U.S.N., Silver Star.
- 10-44\*\*Werner, George H., *S.Sgt.*, U.S.A., Purple Heart.
- 6-45 Amadon, Roger M., *Lt.*, U.S.A., Air Medal and Oak Leaf Cluster.

### CHINA

#### Army

- 10-44 Miao, Yen, *Capt.*

### GREECE

#### Navy

- 10-44 Antippas, Demetri, *Lt.*  
Antoniadis, Panayotis, *D.*

### NETHERLANDS EAST INDIES

#### Army

- 1940 Ivan Swaay, Jan M., *Lt.*

### NEW LISTINGS

#### U.S.A.

- 1925 Hopkins, Omar C., *Maj.*
- 1929 Dube, John E., *Pvt.*  
Howarth, James E., Jr., *Lt. Col.*
- 1931 Davis, Harold J., *1st Lt.*
- 1933 Harper, Thomas, Jr., *Sgt.*
- 1936 Miller, C. Russell, *Pvt.*
- 1938 Brown, John A., Jr., *1st Lt.*
- 1939 Corl, Wiley F., Jr., *Lt.*
- 1941 Karasick, Norman M., *Lt.*  
Kleiman, Joseph, *2nd Lt.*  
True, Walter E., *1st Lt.*
- 1942 Bailey, Perry O., *1st Lt.*  
Place, Eugene W., *Pvt.*
- 2-44 Boucheron, Pierre H., Jr., *2nd Lt.*  
Lindorff, David P., *Sgt.*  
Littlefield, Charles C., Jr., *Pvt.*  
Maxson, Louis W., *Lt.*
- 10-44 Field, James M. W., *Pvt.*  
Glancy, Leonard F., *Pvt.*  
Matthews, Peter D., *O.C.*
- 6-45 Amadon, Roger M., *Lt.*
- \*Harris, Leon F., *2nd Lt.*
- \*Klafstad, Erling, Jr.
- \*Lake, John W., Jr., *Pfc.*
- \*Lobdell, Leon W., *2nd Lt.*
- \*Mack, Leon M., *Pvt.*
- \*Palitz, Bernard G., *Pfc.*
- \*Webb, George W., Jr., *Lt.*
- 2-46 \*Baker, William C.
- \*Wheeler, Peter B., *Pfc.*

#### U.S.N.

- 1918 Kenney, Marion C., *Lt.*
- 1922 Chapman, Harold J., *Comdr.*
- 1933 Dame, Edward L., *Lt. (j.g.)*
- 1937 Kron, R. Vincent, *Lt. (j.g.)*
- 1939 Love, William C., *Ens.*  
McCrodden, Howard J., *Ens.*
- 1940 Farmer, Percy L., Jr., *S.1c.*  
Haig, Chester R., Jr., *Lt. (j.g.)*
- 1941 Dine, Leonard J., *S.1c.*  
Emmanuel, George N., *S.1c.*  
Melucci, Elio J., *F.2c.*
- 1942 Briggs, John D., *Ens.*  
Eley, Harry E., *Ens.*  
Fiedler, George H., *A.S.*
- 1943 Allen, Lloyd R., *S.1c.*  
Kreider, Enos F., *S.1c.*
- 2-44 Hong, Edward H., *R.T.*  
Wilder, Perry W., Jr., *S.2c.*
- 10-44 Hincheliff, Richard H., *Mid.*  
Murray, Gilman Y., *Mid.*  
Rafetto, Herbert C., *Ens.*  
Randolph, Theodore F., *Mid.*  
Taft, Hugh M., *S.1c.*
- 6-45 Hallick, Edward A., *S.2c.*

### CANADA

#### Navy

- 10-44 Perron, Hermel J., Jr., *Sub. Lt.*

Taylor, Clark E., Jr., *Capt. to Maj.*

Wark, Judson W., *Capt. to Maj.*  
Woodward, Howard M., *Lt. to Capt.*

1940 Berges, John A., *Lt. to Capt.*  
Bollerman, Paul V., *Capt. to Maj.*

Casey, John J., Jr., *2nd Lt. to Capt.*

Enos, John E., *T.5. to T.Sgt.*  
Goodman, David R., *Capt. to Maj.*

King, Herbert B., *1st Lt. to Capt.*  
Knight, Joseph K., *2nd Lt. to 1st Lt.*

Libsch, Joseph F., *Lt. to Capt.*  
Luckett, James S., *Lt. Col. to Col.*

Osmun, William G., *Capt. to Maj.*

Rabinowitz, Samuel, *Lt. to Capt.*  
Robbins, Asher B., Jr., *Lt. Col. to Col.*

Stern, William R., *Lt. to Capt.*  
Vandersteel, William, *A.C. to Lt.*

1941 Aaron, John B., *A.C. to 2nd Lt.*  
Abuza, Zachary P., *Lt. to Capt.*

Footte, Irving J., *1st Lt. to Capt.*  
Francis, Arthur S., Jr., *Capt. to Maj.*

Gage, Avery M., *Lt. to Maj.*  
Hemans, John G., *1st Lt. to Capt.*

1942 Schuknecht, Lowell A., *Lt. to Maj.*

Blaustein, Ernest H., *Corp. to 2nd Lt.*  
Borchert, John R., *2nd Lt. to Capt.*

DeCoster, James R., *2nd Lt. to Capt.*

Fay, Richard, *2nd Lt. to Capt.*  
Frithsen, Arthur R., *2nd Lt. to Capt.*

Fuller, Stuart J., Jr., *2nd Lt. to Maj.*

Grogan, Clarence J., *2nd Lt. to Capt.*

Hall, Donald E., *Lt. to Capt.*  
Kimball, Roland B., *2nd Lt. to Capt.*

Larkin, Mayo I., *A.C. to Lt.*  
Leghorn, Kenneth M., *Capt. to Maj.*

Morgan, Thomas C. M., *2nd Lt. to Capt.*

Morse, Roger F., *Lt. to Capt.*  
Rados, Robert M., *2nd Lt. to Maj.*

Rote, William A., *1st Lt. to Capt.*  
Schallert, William L., *1st Lt. to Capt.*

Schloemer, Robert W., *Capt. to Maj.*

Vannab, William E., *Pvt. to T.4.*  
Acker, Nathan H., *2nd Lt. to 1st Lt.*

Cale, Theodore, Jr., *A.C. to 2nd Lt.*

Emond, Alfred A., Jr., *2nd Lt. to 1st Lt.*

Haas, Richard H., *A.C. to 2nd Lt.*  
Mackenzie, John B., *Pvt. to T.3.*

Terry, William B., Jr., *2nd Lt. to Capt.*

Faurot, Robert S., *Pvt. to 2nd Lt.*  
Jaeger, Walter A., *Pvt. to 2nd Lt.*

10-44 Karol, Arthur S., *Pvt. to 2nd Lt.*  
Robinson, Paul M., Jr., *A.C. to 2nd Lt.*

Schmitz, Andrew J., Jr., *A.C. to 2nd Lt.*  
Williams, Edward H., *3rd Corp. to 2nd Lt.*

Mullen, Jay, *Pvt. to T.5.*

O'Neill, Barrett, *Pfc. to 2nd Lt.*

\*\*Pantazi, Spiros G., *Corp. to Lt.*  
Rowan, Henry M., *A.C. to Lt.*

Vatis, Anastassios T., *Pvt. to T.Sgt.*

\*\*Werner, George H., *Corp. to S.Sgt.*

### U.S.N.

1912 Wyman, Dwight M., *Lt. to Lt. Comdr.*

1918 Little, Harold G., *Lt. Comdr. to Comdr.*

1920 McGuigan, Joseph L., *Lt. Comdr. to Capt.*

Miles, Arthur C., *Comdr. to Rear Adm.*

Royce, Donald, *Comdr. to Rear Adm.*

1922 Cushman, Charles H., *Lt. Comdr. to Capt.*

Tabor, Lewis P., *Lt. Comdr. to Comdr.*

Woodruff, Wilbur J., *Lt. to Lt. Comdr.*

1923 King, Harvey M., *Lt. to Lt. Comdr.*

1924 Pihl, Paul E., *Capt. to Commo.*  
Velz, Robert, *Lt. Comdr. to Capt.*

1925 Greatwood, H. Royce, *Lt. to Lt. Comdr.*

Killian, Thomas J., *Lt. Comdr. to Comdr.*

1928 Schade, Henry A., *Capt. to Commo.*

Sherman, Wilson R., *Lt. Comdr. to Comdr.*

1930 Sealy, Robert, Jr., *Lt. to Lt. Comdr.*

1931 Forest, Francis X., *Lt. to Capt.*  
Raftery, Thomas J., *Lt. Comdr. to Capt.*

1932 Combs, Thomas S., *Comdr. to Commo.*

1933 Griffin, Cornelius J., *Ens. to Lt.*  
Howard, William E., Jr., *Lt. to Comdr.*

James, Ralph K., *Lt. to Comdr.*  
Ragsdale, Edmund M., *Comdr. to Capt.*

Smythe, John B., *Lt. Comdr. to Comdr.*

1934 Robinson, James M., *Lt. Comdr. to Comdr.*

1935 Englund, Harry W., *Lt. to Comdr.*  
Helwath, Edward E., *R.T.3c. to R.T.2c.*

Siver, Chester A., *Lt. to Lt. Comdr.*

1936 Brown, C. Donald, *Lt. to Lt. Comdr.*

Easley, Harry E., Jr., *Ens. to Lt. (j.g.)*

Whiteside, William S., *Lt. to Capt.*

1937 Drouilhet, Paul R., *Lt. to Comdr.*  
Poehler, Robert S., *Ens. to Lt. (j.g.)*

Schultz, Floyd B., *Lt. to Comdr.*  
Zemansky, Stanley D., *Ens. to Lt. (j.g.)*

1938 Loveland, William, *Lt. to Comdr.*  
Rumble, Henry P., *Lt. to Comdr.*

1939 Baird, Abraham L., *Lt. Comdr. to Comdr.*

Haley, Thomas B., *Lt. Comdr. to Comdr.*

1940 Edwards, Theodore A., *A.S. to S.1c.*

Hindle, H. Brook, Jr., *Ens. to Lt. Metzger, Alfred B., Lt. to Comdr.*

Pieczentkowski, Herman A., *Lt. Comdr. to Comdr.*

Reynolds, James R. Z., *Lt. Comdr. to Comdr.*

Robb, Budd R., *S.2c. to A.M.M.3c.*

Snyder, R. Robert, *R.T.3c. to Sp.3c.*

- 1940 Wade, Benjamin G., *Lt. to Comdr.*  
Wright, Boger, *Ens. to Lt. (j.g.)*  
1941 Eustis, Richard S., Jr., *Ens. to Lt.*  
Howell, Walter D., *Ens. to Lt. Comdr.*  
Miller, Edward K., Jr., *Ens. to Lt. (j.g.)*  
Mitchell, Gilbert H., *Lt. to Comdr.*  
Roddiss, William H., *S.1c. to A.R.T.3c.*  
1942 Aubert, Eugene J., *Ens. to Lt.*  
Cavey, Edward C., Jr., *Ens. to Lt. (j.g.)*  
Dach, Arnold A., *Ens. to Lt.*  
Gralla, Arthur R., *Lt. to Comdr.*  
Haggard, William H., 2nd, *Ens. to Lt.*  
Lambert, David, *Lt. Comdr. to Comdr.*  
Lynch, William M., *Ens. to Lt.*  
Maier, William R., *Ens. to Lt.*  
McNeal, Daniel R., Jr., *Ens. to Lt. (j.g.)*  
Ring, Harold F., *Lt. (j.g.) to Lt.*  
Saathoff, George T., *Ens. to Lt.*  
Sheetz, John W., 3rd, *Ens. to Lt.*  
Swope, Oliver P., Jr., *Ens. to Lt. (j.g.)*
- 1943 Anderson, Bernard E., *Ens. to Lt. (j.g.)*  
Batiuchok, Andrew, *A.C. to Mid.*  
Berghausen, Edward J., *Ens. to Lt. (j.g.)*  
Carpenter, Stephen W., *Lt. Comdr. to Comdr.*  
Davenport, Wilbur B., Jr., *Ens. to Lt. (j.g.)*  
Gagarin, Gregory G., *Ens. to Lt. (j.g.)*  
Hathaway, Charles A., *Ens. to Lt. (j.g.)*  
Kirkpatrick, Allen, 3rd, *Ens. to Lt. (j.g.)*  
Torney, John F., *Ens. to Lt. (j.g.)*  
Walker, Malcolm C., *Ens. to Lt. (j.g.)*
- 2-44 Hird, Martin C., *Mid. to Ens.*  
Nicolait, Robert, *A.S. to S.2c.*  
Rockett, John A., *A.S. to S.1c.*  
Signell, Warren I., *A.S. to Ens.*  
Stewart, William S., 3rd, *Mid. to Ens.*
- 10-44 Munroe, William R., Jr., *Ens. to Lt. (j.g.)*  
Reigart, John M., *Lt. to Lt. Comdr.*  
Tillson, Henry C., *A.S. to Mid.*
- RANKS NOT PREVIOUSLY PUBLISHED**
- 2-44 Bavicchi, John A., *Ens., U.S.N.*  
Kingsbury, Bruce F., *Ens., U.S.N.*  
Schneider, Caspar C., Jr., 2nd *Lt., U.S.A.*  
10-44 Peters, Wilbur R., Jr., *Ens., U.S.N.*  
Speckmann, Robert E., *Ens., U.S.N.*
- CASUALTIES**
- 1927 ★Shisko, Alexander G., *Lt., U.S.N.*  
— South Pacific.  
1935 ★Trescher, William, *Lt., U.S.A.*  
— Germany.  
1936 ★Steinhurst, William A., *Capt., U.S.A.* — plane crash in France.  
1940 †Nash, Lloyd, *Maj., U.S.A.*  
†van Swaay, Jan M., *Lt., Netherlands East Indies Army* — Japan.  
1943 ★Fleming, Lamar, 3rd, *Lt., U.S.A.* — Europe.
- 10-44 †Hagopian, Robert, *Pfc., U.S.A.* — Belgium.  
\*\*Pantazi, Spiros G., *Lt., U.S.A.*  
†Robson, Horace T., *Pvt., U.S.A.* — Ardennes area.  
†Steiner, Harold A., Jr., 2nd *Lt., U.S.A.* — Germany.  
6-45 ★Dixon, Robert E., 2nd *Lt., U.S.A.* — in an English hospital, from wounds received on a bombing mission.  
†Hallick, Edward A., *S.2c., U.S.N.* — Pacific.  
★Harris, Leon F., 2nd *Lt., U.S.A.*  
★Klafstad, Erling, Jr., *U.S.A.* — Scott Field, Ill.  
†Lake, John W., Jr., *Pfc., U.S.A.* — Germany.  
†Lobdell, Leon W., 2nd *Lt., U.S.A.* — Germany.  
★Mack, Leon M., *Pvt., U.S.A.* — Belgium.  
\*\*Palitz, Bernard G., *Pfc., U.S.A.*  
†Webb, George W., Jr., *Lt., U.S.A.* — Germany.  
2-46 ★Baker, William C., *U.S.A.* — France.  
★Wheeler, Peter B., *Pfc., U.S.A.* — France.
- ★ Killed in Action      † Missing in Action      ‡ Prisoner of War      \* Died or killed in Service      \*\*Wounded

## ALUMNI IN THE HIGH COMMAND



### U. S. A.

- 1907 Fredendall, Lloyd R., *Lt. Gen.*  
Godfrey, Stuart C., *Brig. Gen.*  
1909 Blood, Kenneth T., *Maj. Gen.*  
1910 Nichols, William R., *Brig. Gen.*  
1911 Kenney, George C., *Lt. Gen.*  
Spalding, Sidney P., *Maj. Gen.*  
Weeks, Lawrence B., *Brig. Gen.*  
1912 Montgomery, Edward, *Brig. Gen.*  
1913 Gardner, Fulton Q. C., *Maj. Gen.*  
†Jones, Albert M., *Maj. Gen.*  
1914 Waitt, Alden H., *Brig. Gen.*  
Wood, John E., *Brig. Gen.*  
1915 Gillespie, Alexander G., *Brig. Gen.*  
1916 Boatwright, Walter P., *Brig. Gen.*  
Harms, Henry W., *Brig. Gen.*  
\*Hyde, James F. C., *Brig. Gen.*  
1917 Groves, Leslie R., Jr., *Maj. Gen.*  
Hegenberger, Albert F., *Brig. Gen.*  
Kingman, Allen F., *Brig. Gen.*  
Williford, Forrest E., *Brig. Gen.*  
1920 Bradshaw, Aaron, Jr., *Brig. Gen.*  
Case, Rolland W., *Brig. Gen.*  
Colton, Roger B., *Maj. Gen.*  
Van Volkenburgh, Robert H., *Brig. Gen.*  
Whitten, Lyman P., *Brig. Gen.*  
1921 Allen, Harvey C., *Brig. Gen.*  
Baylies, James E., *Brig. Gen.*  
Carroll, Franklin O., *Brig. Gen.*  
Donovan, Richard, *Maj. Gen.*  
Hume, Edgar E., *Brig. Gen.*

- Hutchings, Henry, Jr., *Brig. Gen.*  
Loper, Herbert B., *Brig. Gen.*  
Lull, George F., *Maj. Gen.*  
Moses, Raymond G., *Brig. Gen.*  
Murray, Maxwell, *Maj. Gen.*  
Newman, James B., Jr., *Brig. Gen.*  
Neyland, Robert R., Jr., *Brig. Gen.*  
Noce, Daniel, *Maj. Gen.*  
Quinton, Alfred B., Jr., *Brig. Gen.*  
Scott, Stanley L., *Brig. Gen.*  
Shingler, Don G., *Brig. Gen.*  
Worsham, Ludson, D., *Brig. Gen.*  
1922 Browning, Albert J., *Brig. Gen.*  
Dunkelberg, Wilbur E., *Brig. Gen.*  
Heavey, William F., *Brig. Gen.*  
Hoge, William M., *Brig. Gen.*  
Howard, Clinton W., *Brig. Gen.*  
Johns, Dwight F., *Brig. Gen.*  
Styer, Wilhelm D., *Lt. Gen.*  
1923 Chavin, Raphael S., *Brig. Gen.*  
Christmas, John K., *Brig. Gen.*  
Coffey, John W., *Brig. Gen.*  
Covell, William E. R., *Maj. Gen.*  
Hinds, John H., *Brig. Gen.*  
Randall, Russell E., *Brig. Gen.*  
Reimel, Stewart E., *Brig. Gen.*  
Safford, Hermon F., *Brig. Gen.*  
Shugg, Roland P., *Brig. Gen.*  
1924 Doolittle, James H., *Lt. Gen.*  
Henry, Stephen G., *Maj. Gen.*  
McSherry, Frank J., *Brig. Gen.*  
Wells, Gordon M., *Brig. Gen.*

- 1925 Holman, Jonathan L., *Brig. Gen.*  
Kraus, Walter F., *Brig. Gen.*  
1926 Danielson, Wilmot A., *Brig. Gen.*  
1928 Badger, George M., *Brig. Gen.*  
Bradley, Joseph S., *Brig. Gen.*  
Gardner, Grandison, *Brig. Gen.*  
Hauseman, David N., *Brig. Gen.*  
Niblo, Urban, *Brig. Gen.*  
1929 Rush, Hugo P., *Brig. Gen.*  
1930 Flory, Lester D., *Brig. Gen.*  
Schulgen, George F., *Brig. Gen.*  
1931 Loucks, Charles E., *Brig. Gen.*  
1932 Meyer, Henry J. D., *Brig. Gen.*  
1933 Kabrich, William C., *Brig. Gen.*  
1935 Barber, Edward, *Brig. Gen.*  
1936 Beebe, Royden E., Jr., *Brig. Gen.*  
Lacey, Julius K., *Brig. Gen.*  
1937 Moore, Ernest, *Brig. Gen.*

### U. S. N.

- 1901 Whitman, Ralph, *Rear Adm.*  
1905 Furer, Julius A., *Rear Adm.*  
Willson, Russell, *Vice Adm.*  
1906 Fisher, Charles W., *Rear Adm.*  
1907 Land, Emory S., *Vice Adm.*  
Ryden, Roy W., *Rear Adm.*  
Van Keuren, Alexander H., *Rear Adm.*  
1909 Howard, Herbert S., *Rear Adm.*  
1910 Chantry, Allan J., Jr., *Rear Adm.*  
1914 Richey, Thomas B., *Rear Adm.*  
1915 Brand, Charles L., *Rear Adm.*  
1917 Crisp, Frederick G., *Rear Adm.*  
Pace, Ernest M., Jr., *Rear Adm.*

- Sherman, Forrest P., *Rear Adm.*  
Sullivan, William A., *Commodore*  
1920 Cochran, Edward L., *Rear Adm.*  
Hayler, Robert W., *Rear Adm.*  
Miles, Arthur C., *Rear Adm.*  
Royce, Donald, *Rear Adm.*  
1921 Richardson, Lawrence B., *Rear Adm.*  
Vickery, Howard L., *Vice Adm.*  
1922 Beatty, Frank E., *Rear Adm.*  
Kitts, Willard A., 3rd, *Rear Adm.*  
1923 ★Mullinnix, Henry M., *Rear Adm.*  
1924 Pihl, Paul E., *Commodore*  
Royal, Forrest B., *Rear Adm.*  
Stump, Felix B., *Rear Adm.*  
1925 Durgin, Calvin T., *Rear Adm.*  
Schoeffel, Malcolm F., *Rear Adm.*  
1926 Pride, Alfred M., *Rear Adm.*  
1928 Schade, Henry A., *Commodore*  
1932 Combs, Thomas S., *Commodore*

### U. S. C. G.

- 1913 Smith, Edward H., *Rear Adm.*

### CANADA

#### Army

- 1913 Young, James V., *Maj. Gen.*

### CHINA

#### Army

- 1916 Wong, Tsao, *Lt. Gen.*  
1926 Chu, Shih, M., *Lt. Gen.*

#### Navy

- 1915 Mar, Pellian T. C., *Rear Adm.*



## ALUMNI AND OFFICERS IN THE NEWS

## Congratulations

¶ To FRANK B. JEWETT '03, who, at a dinner meeting of the New York Electrical Society on January 10, was elected an honorary member in recognition of his "outstanding contributions to the advancement of science, engineering and industry in this country and for . . . outstanding work in behalf of the . . . Society."

¶ To WILLIAM A. SULLIVAN '17, a commodore in the Navy, who has been made an Honorary Commander, Order of the British Empire, for his skillful handling of American and British salvage forces during the African, Sicilian, and Salerno operations.

¶ To EDWARD P. WARNER '17, who has achieved an honorary fellowship in the Institute of the Aeronautical Sciences, to BENJAMIN S. KELSEY '28, a colonel in the Army Air Forces, on whom has been conferred the Octave Chanute Award of the Institute for his work in testing high-speed aircraft, and to WILLIAM H. PHILLIPS '28, winner of its Lawrence Sperry Award for the best contribution of a young man to aeronautical science.

¶ To ELLIOT L. WHITAKER '31, who has won the first prize of \$1,500 in war bonds in the "Flexible Heating" Competition sponsored by the Bituminous Coal Institute and judged on December 4 and 5 at the University of Cincinnati in Ohio; to STEPHEN J. ALLING '33, winner of the second prize of \$750 in war bonds in the same contest; and to FREDERICK W. WESTMAN '24, JOSEPH SHILOWITZ '32, and ROBERT A. DESHON '40, all of whom received from the Institute \$100 awards in war bonds.

¶ To ARTHUR G. RUSSELL '32, whom the Navy Department has presented with a meritorious civilian service award for "heroic" assistance during an explosion and fire at Pearl Harbor on last May 21.

## Assignments

¶ For WILLIAM C. LOUNSBURY '03, re-appointed chairman of the executive safety committee of the Duluth Chamber of Commerce.

¶ For FRANK B. JEWETT '03 and RUFUS E. ZIMMERMAN '11, chosen members of a committee of eight industrial executives appointed by the Secretary of Commerce to advise the Department of Commerce and the American Standards Association on future plans for standards work. This committee was one result of the business conference called in New York on January 12.

¶ For BRADLEY DEWEY '09, elected president of the American Chemical Society for 1946 and holding office this year as president-elect.

¶ For EDWARD P. BROOKS '17, elected a director of the Erie Railroad Company.

¶ For THEODORE P. WRIGHT '18 and DONALD W. DOUGLAS '14, as among the founders of the new Air Force League, a national civilian organization designed to work for permanently strong and efficient United States air forces.

¶ For FREDERICK S. BLACKALL, JR., '22, elected president of the New England Council.

¶ For OTTO K. EITEL '24, appointed a member of the Hotel Industry Advisory Committee.

¶ For BEVERLY DUDLEY '35, as a member of the meeting and papers committee of the Chicago section of the Institute of Radio Engineers and one of the representatives of that institute to the Illinois Engineering Council; and for LOUIS E. PEPPERBERG '37, as an industrial representative of the institute.

¶ For GERARD CHAPMAN '36, elected chairman of the Lake Superior section of the American Chemical Society.

## Royalties

¶ To RALPH G. HUDSON '07 for *An Introduction to Electronics*, MacMillan.

¶ To STUART CHASE '10 for *Democracy Under Pressure*, subtitled *Special Interests versus the Public Welfare*, Twentieth Century Fund.

¶ To FREDERICK E. TERMAN '24, author of *Radio Engineering* and the *Radio Engineers' Handbook*, McGraw-Hill, whose career is sketched in flattering detail in the *Technical Education News* for January, which says: "He still works much like a steam roller, without hurry and false moves. Each job is performed with such thorough methods that the road never has to be gone over again. He has developed an ability to turn his attention on or off instantaneously."

¶ To PHILIP FRANKLIN, staff, for *Methods of Advanced Calculus*, McGraw-Hill.

## With the Arts

¶ The print department of the Boston Public Library has recently acquired a complete set of prints, a number of trial proofs, experimental plates, drawings, water colors, and oils of CHARLES H. WOODBURY '86. During December

it held an exhibition of his prints, water colors, and oils which was a significant tribute to an eminent artist and teacher.

## In the Journals

¶ By KARL T. COMPTON, President, "Contributions to Education by Colonel Bradley Dewey," *Chemical and Engineering News*, December 10.

¶ By CHARLES G. ABBOT '94, "A Strange Coincidence of Errors," *Science*, February 9.

¶ By EDGAR A. WEIMER '98, "The Pollution of Rivers," *General Magazine and Historical Chronicle*, the quarterly alumni publication of the University of Pennsylvania, for autumn.

¶ By THOMAS C. DESMOND '09, "Your Town Versus Tooth Decay," *Read* magazine, December; "Coming — Careers of Crime for Our Children," *Magazine Digest*, January; and "Studying Foods in School," *Hygeia, the Health Magazine*, February.

¶ By BRADLEY DEWEY '09, "The Role of Organized Research and Business in American National Defense," *Chemical and Engineering News*, December 10.

¶ By BERTHOUD C. BOULTON '16, "Organizing Knowledge of Materials," *Product Engineering*, February.

¶ By ROYAL BARRY WILLS '18, "The Coming 'Boom' in Home Building," *Industry*, January.

¶ By HOWARD FIELD, JR., '20, "Design of Hydraulic Systems: Part I — Pumps and Their Application; Part II — Packings and Their Application," *Product Engineering*, January and February.

¶ By CHARLES H. BLAKE '25, "Orthography of Scientific Names," *Science*, February 16.

¶ By RAYMOND MANCHA '26, "Underground Mine Pressure Surveys Studied by Ventilation Committee," *Mining and Metallurgy*, February.

¶ By ROBERT S. HARRIS '28, ERNEST E. LOCKHART '34, ALBERT H. NAGEL '42, HELEN S. LOCKHART and MARY K. NUTTER, staff, Elizabeth W. Tapia, and Virginia Tiffany, "Study of the Nutritional Quality of Dietsaries by Chemical Analysis," *Journal of the American Dietetic Association*, December.

¶ By ANTHONY STANDEN '29, "Elementary Chemistry for Liberal Arts Students at St. John's College," *Journal of Chemical Education*, November.

¶ By CARL F. FLOE '35 and MICHAEL B. BEVER '42, "Nonferrous Physical Metallurgy," *Mining and Metallurgy*, February.

¶ By HORACE S. FORD, staff, "Investments for College Endowments," *United States Investor*, December 23.

¶ By LAWRENCE R. NORWOOD, staff, "Fourier Division," *Tech Engineering News*, November.

¶ By FRANCIS O. SCHMITT, staff, "X-Ray and Electron Microscope Studies of the Structure of Collagen Fibers," *Journal of the American Leather Chemists Association*, November.

### Heard From

¶ B. EDWIN HUTCHINSON '09, at the December 7 session on industry's post-war program of the Reconversion Congress of American Industry held by the National Association of Manufacturers, on the subject, "Industry's Program for Peace."

¶ DEAN PEABODY, JR., '10 and HOWARD R. STALEY '35, at the February 14 meeting of the designers' section of the Boston Society of Civil Engineers, on "Creep Measurements of Pre-stressed Gunite and Concrete Bars."

¶ PAUL V. FARAGHER '13, before the Birmingham section of the Association of Iron and Steel Engineers on January 29, on the highlights of the past, present, and future of the aluminum industry.

¶ FRANK E. RICHARDSON '16, at the general meeting of American industry called jointly by the American Society of Mechanical Engineers, the American Standards Association, and the Society of Automotive Engineers for the purpose of hearing first reports of the United States-Canadian Screw Thread Mission which had been sent by the Combined Production and Resources Board to London for conferences with British experts on screw thread standardization. Mr. Richardson reported on "Instrument Threads" and on "High Duty Studs in Non-ferrous Castings."

¶ EDWARD R. SCHWARZ '23, before the Boston section of the American Society of Mechanical Engineers on February 15, on "Design for Accident Prevention."

¶ PRESCOTT H. LITTLEFIELD '24, as a panel member at the January 31 afternoon session of the finance conference of the American Management Association, on "Corporate Taxes after the War"; and RAYMOND S. PERRY '20, as chairman of the February 1 afternoon session of the same conference.

¶ JOHN STACK '28, before the Institute of Aeronautical Sciences in Washington, in the Wright Brothers' Lecture for 1944 given on December 17, the 41st anniversary of the first flight and the occasion of the presentation of the Collier Trophy to Captain LUIS DE FLOREZ '11. Introduced by EDWARD P. WARNER '17, Mr. Stack indicated that the shape and structure of the airplane would have to be changed consider-

ably to achieve a practical speed much beyond 500 miles an hour.

¶ MORRIS COHEN '33, before the Chicago chapter of the American Society for Metals meeting on December 14 at the Chicago Bar Association, on "The Practical Heat Treatment of High Speed Steels in the Light of Recent Research"; and before the Cleveland chapter of the same society meeting on January 8 at the Cleveland Club, on "The Metallography of High Speed Steel."

¶ KENNETH N. MATHES '35, at the winter technical meeting of the American Institute of Electrical Engineers, where he and B. H. Thompson described tests evolved in a General Electric laboratory as a means of combating electrolytic corrosion on insulating materials in the tropics.

¶ MILLER A. WACHS '35, at a meeting of the southern New England section of the Society of Automotive Engineers on February 7, on "Building Utility into the Helicopter."

### Randall's Raiders

¶ American Mustang fighters defending western China cities turned to successful offensive sorties with the arrival at their base of Brigadier General RUSSELL E. RANDALL '23. "The enemy strikes back only at night and at rare intervals — and meets opposition even in the dark from Randall's Raiders," as the squadron has named itself.

## DEATHS

\* Mentioned in class notes.

- ¶ WILSON EYRE '79, October 23.
- ¶ ALFRED L. FITCH '84, January 4.
- ¶ ANSON W. ALLEN '85, December 25.\*
- ¶ WILLIAM E. SHEPARD '86, May.
- ¶ SAMUEL B. STEWART '86, December 24, 1943.
- ¶ ALBERT L. CUSHING '87, October 25.\*
- ¶ ARTHUR C. SPRAGUE '87, November 15.\*
- ¶ CHARLES P. NUTTER '88, December 9.\*
- ¶ ALONZO J. HAMMOND '91, December 1.\*
- ¶ WILLIAM E. LELAND '91, January 11.
- ¶ FRANK I. DAVIS '92, August 21.
- ¶ GEORGE W. HARRING '94, December 7.
- ¶ ALBERT GEIGER '95, December 6.
- ¶ EDWARD P. SCHOENTGEN '95, October 17.
- ¶ JOHN S. HALLARAN '96, January 24.\*
- ¶ HOWARD E. SMITH '96, June 27.\*
- ¶ FRANCIS C. THOMAS '96, September 24.
- ¶ GEORGE H. BLISS '97, November 28.\*
- ¶ NATHAN C. BURRILL '97, May 26.\*
- ¶ FREDERIC FURBISH '98, June 4.

¶ JAMES R. GUY '98, December 4.

¶ MARY J. THOMSON '98, October 21.

¶ LEONARD H. FIELD, JR., '99, August 29.\*

¶ WILLIAM R. ALLEN, JR., '00, May 11, 1943.\*

¶ ROBERT C. ALLEN '01, October 30.

¶ WILLIAM H. DOOLEY '01, December 7.

¶ CHARLES P. ROCKWOOD '01, January 22.

¶ HERBERT M. HATHAWAY '02, November 6.

¶ WILLARD C. BARNES '03, December 18.

¶ ASA E. GODDARD '03, December 2.\*

¶ KENNETH JEWETT '03, November 28.\*

¶ LAURA M. LUNDIN '03, December 30.

¶ MERTON L. EMERSON '04, February 8, industrial engineer, officer and director of various corporations, was for many years with the American Pneumatic Service Company. During World War I he was a major in the Chemical Warfare Service and since 1933 had been connected with the Federal Administration of Public Works. He was identified with Thayer Academy, where he prepared for the Institute, as president of the board of trustees, with Wentworth Institute, as an active trustee, and with Technology, as a term member of the Corporation. Always a leader in alumni affairs, he had recently served on the Alumni Council as representative from the Washington Society, of which he was president.

¶ ELMER W. WIGGINS '05, October 18.

¶ ANDREW H. KELEHER '06, March 14, 1944.

¶ ADDISON MILLER '07, September 7.

¶ SYDNEY I. SNOW '10, January 16.

¶ J. L. McALLEN '11, November 19.\*

¶ GEORGE E. ROBINSON '12, January 16.

¶ FERDINAND H. PENDLETON '13, June 19.\*

¶ LINDSEY W. WHITEHEAD '13, July 15.\*

¶ HARRY B. NEAGLE '14, April 10.

¶ RICHARD E. HERCZEL '20, March 13, 1942.\*

¶ CHARLES J. MULLER '20, November 16.\*

¶ WILLIAM F. WILD '20, November 13.

¶ JOHN D. H. KANE '25, June 13.\*

¶ EMIL H. M. LEHNHARDT '25, October 31, 1943.\*

¶ FRANCIS W. MCGINNIS '25, November 24, 1943.\*

¶ ROGER W. PARKINSON '25, September 26.\*

¶ ALEXANDER G. SHISKO '27, January.\*

¶ JOHN C. HEIST '41, September 2.\*

¶ RICHARD K. HENRY, JR., '41, December 15.\*

¶ EVERETT J. GRAHAM, JR., '43, October 20.\*



## NEWS FROM THE CLUBS AND CLASSES

## CLUB NOTES

*A.S.C.E.*

During the annual meeting of the American Society of Civil Engineers, the usual luncheon for Alumni, sponsored by the Technology Club of New York, was held at the Engineers' Club on January 18. Al Glassett '20, as chairman of the luncheon, introduced George Dandrow '22, President of the New York Club, who welcomed the group and issued a cordial invitation to all to visit the Club at 24 East 39th Street and inspect the many new improvements that have been made. He explained that because of its popularity at lunchtime and the addition of the new ladies' lounge and dining room, the Club could not handle luncheons on such a large scale. Professor Charles B. Breed '97 was then asked to say a few words and introduce the new acting head of Course I, Professor John B. Wilbur '26. Plans for the development of the Department of Civil and Sanitary Engineering and for some suggested changes were ably explained by Dr. Wilbur, assisted by Professor W. E. Stanley.

Present at the luncheon were the following 39 Alumni: R. E. Bakenhus '96, I; G. E. Barnes '23, I; C. J. Bernhard '28, II; W. D. Binger '16, I; C. B. Breed '97, I; E. S. Chase '06, XI; C. G. Dandrow '22, IX-B; J. F. Downey, Jr., '20, IX-B; L. M. Gentleman '22, I; A. T. Glassett '20, I; R. H. Goldsmith '37, IX-B; R. H. Gould '11, XI; W. J. Gress '24, I; L. C. Hammond '02, I; A. G. Hayden '01, I; K. R. Kennison '08, II; W. L. Keplinger '24, IX-B; M. H. Klegerman '28, XI; R. S. M. Lee '26, I; T. M. Lowe '25, I; E. L. MacDonald '13, I; Medwin Mathews '20, I; H. S. Morse '03, I; R. R. Philippe '29, I; P. L. Price '00, IV; W. G. Rapp '22, I; K. C. Reynolds '25, I; S. C. Reynolds '20, IV; M. G. Salzman '25, IX-B; A. L. Shaw '09, I; G. H. Shaw '04, X, XI; D. E. Stearns '29, IV-A; Hale Sutherland '10, I; D. W. Taylor '34, I; T. C. Tuck '00, I; J. B. Wilbur '26, I; L. D. Wilson '20, I; W. T. Wilson '04, I; and Edward Wininger '24, I.

*M.I.T. Association of Buffalo*

On January 18 the Association gathered at the University Club for dinner and an inspection of the aircraft division of the Chevrolet plant. Our President, Tom Speller '29, being away on business, Ben Buerk '30, as vice-president, conducted the meeting, which was attended by some 40 Alumni. Our hats go off to those from Lockport and other places out of town for braving the weather to drive to Buffalo. Unfortunately, at the last minute the War Department canceled its permission for us to visit the plant. Arthur Harris, assistant chief engineer, and William White from the test inspection department at the aircraft division of Chevrolet were on hand, however, and each gave an extremely enlighten-

ing talk. The boys got very interested in water injection into aircraft engines, and many were the theories and explanations given. All in all, the meeting was most successful, and our thanks go to John Rumsey for arranging it. — WALTER H. SHERRY '37, *Secretary*, Ferguson Electric Construction Company, 204 Oak Street, Buffalo 3, N.Y.

*Kanawha Valley Active*

On the evening of January 9, a group of Technology Alumni from the Kanawha Valley gathered at the Daniel Boone Hotel in Charleston, W. Va., for the first Technology smoker ever held in that region. Twenty-six men, representing classes from '09 to '42, responded to the invitations sent out by Daniel G. Hulett '42, who had fathered the idea. As a result of the interest shown at the meeting, a committee of three was established to plan for a second get-together at a later date. William S. Brackett '23, of the Carbide and Carbon Chemicals Corporation, Russell P. Westerhoff '27, of Ford, Bacon, and Davis, Inc., and Arthur W. Barry '37, of E. I. du Pont de Nemours and Company, agreed to serve in this capacity. After the business meeting Edgerton high-speed movies were displayed by Roland D. Glenn '33. The remainder of the evening was spent in pursuit of the elusive poker chip or in earnest and animated discussion of those problems so dear to the heart of the young engineer — wages and hours, and professional status and unionism.

Assisting Hulett in the staging of the party were Malcolm M. Anderson '42, Ralph L. Kelly, Jr., '42, and John C. Collins '42, handling the beverage department; Arthur W. Barry '37 and Roland D. Glenn '33, in the motion picture division; and John H. Howell '35 and R. K. Turner '23, carrying out special missions. In addition to those previously mentioned, the following Alumni were present: Arthur M. Rosenblatt '09, Charles F. Hobson '11, Ray M. Durrett '29, Richard Gorman, Jr., '33, Paul J. Johnson '33, Roy M. Crawford '34, W. Vernon Osgood '36, E. Glenn Soash '36, Benjamin T. Woodruff '36, Farmer L. Current '37, Robert Coleman '40, Robert B. Egbert '40, Carl S. Oldach '41, Ernest F. Artz '42, Eugene W. Hanszen '42, and Richard T. Merritt, Jr., '42.

*Technology Club of Cincinnati*

The annual dinner meeting was held at the University Club on Friday evening, December 1. The meeting was called to order by our President, Fred Garber '03. The nominating committee proposed the following club officers for the ensuing year: President, Kenneth A. Wright '19; Vice-president, Fred W. Morrill '07; Treasurer, Oliver L. Bardes '21; and Secretary, George F. Schatz '30. A motion was made and seconded instructing the Secretary to cast a unanimous ballot for the above officers.

Guest speaker for the evening was Henry B. Kane '24, director of the Alumni Fund. His talk, "The Wild World," was illustrated by a series of remarkable photographs of birds, animals, and insects in natural color. Mr. Kane's subject, his keen sense of humor, and his spectacular high-speed photography were enthusiastically received by the attending members. At the close of his address he was given a spontaneous standing vote of thanks. The slides were projected by Jack Cochrane '23 in his usual able manner.

The following members were present: Morten Carlisle '90, C. H. Urban '91, Moritz Sax '96, A. H. Pugh '97, F. W. Garber '03, W. B. Fogarty '04, H. D. Loring '07, F. W. Morrill '07, C. H. Spiehler '08, W. V. Schmiedeknecht '12, S. H. Champlin '13, G. H. Clark '13, C. F. Cellarius '16, Jacob Lichter '19, K. A. Wright '19, A. H. Kinghorn, Jr., '20, M. M. Whitaker '20, O. L. Bardes '21, James Le Grand '21, M. A. Youtz '21, F. W. Spalding '22, J. D. Cochrane, Jr., '23, J. C. Todd '23, A. C. Brown '25, G. F. Schatz '30, H. M. Nazor '32, S. I. Crew '34, H. V. Sternberg '39, Harold Graham '40. — GEORGE F. SCHATZ, *Secretary*, 2400 Homestead Place, Cincinnati, Ohio.

*Technology Club of Northern Texas*

After a period of inactivity, the Club resumed its bimonthly meetings last November with a gathering for the members and their wives at which George Sergeant, world traveler and former mayor of Dallas, was the speaker. In a talk entitled "Queer Customs of the Orient," Mr. Sergeant described many of the peculiar religious practices he had observed during his travels in Japan, China, and India. The talk was timely and well received by the members and their guests. A tour of the Magnolia Petroleum Company's research laboratories at Dallas was arranged for the second meeting, which was held on January 15. The tour was particularly interesting in that it gave many of the members a firsthand idea of the extent to which the oil industry serves the war effort.

By means of a mail ballot opinions were obtained from members on these two questions: "Is there any merit in the idea that M.I.T. should arrange to give refresher courses to our men after the war so that these men may be better prepared to get back into industry? If such courses are desirable, what should be their scope?" The members were unanimous in believing that such refresher courses should be given. As to their scope, the following composite statement was agreed upon: "M.I.T. refresher courses for the returning graduate war veterans should not only provide an opportunity for the veteran to brush up on the technical aspects of his chosen field but should also provide him with sufficient information to make a wise choice of the business or professional field he should enter, in view of the many changes that have taken place in the economic setup of

the nation. It is considered very important that the modern trends in employee-management relations be presented to him objectively in order that he be able to adjust himself rapidly to this new aspect of American industry." So far nothing has been done to provide a replacement service for graduates returning to our community from the armed services, but a committee is being formed to study this problem.

Although we have nearly 100 Technology graduates living in our area, only 25 or 30 are active in club affairs. The attendance at meetings varies from 12 to 20. — DAYTON H. CLEWELL '33, *Secretary*, Magnolia Petroleum Company, Field Research Department, P.O. Box 900, Dallas, Texas.

### *Indiana Association of the M.I.T.*

The December meeting was held on November 29 in order that we might have Henry B. Kane '24 from Cambridge entertain us. This he did in most interesting fashion with his illustrated talk on "Wild Life." There was a turnout of almost 20 at the new meeting place, the Apex Grill on 16th Street.

The January meeting was again held at the Apex Grill and according to the regular schedule, on the second Wednesday of the month, which fell on January 10. An interested audience listened attentively to F. S. Badger, Jr., '27, Vice-president in charge of research for Haynes Stellite in Kokomo. Mr. Badger discussed the "Lost-Wax Casting Method," explaining its virtues and limitations.

The next regular meeting is planned for February 14. — THOMAS G. HARVEY '28, *Secretary*, Monarch Steel Company, 545 West McCarty Street, Indianapolis 7, Ind.

### *Technology Club of New York*

A luncheon for Alumni attending the annual meeting of the American Society of Civil Engineers, arranged by this Club, was given at the Engineers' Club on January 18. Al Glassett '20 served as chairman; President Dandrow '22, as host. The speakers were Professor Charles B. Breed '97 and Professor William E. Stanley, both of the Department of Civil and Sanitary Engineering at the Institute.

The following Alumni have been admitted to membership: Edward H. Mangan '12, Vice-president, Electro Metallurgical Company, New York City; Ellis W. Brewster '13, President, Plymouth Cordage Company, North Plymouth, Mass.; Lee H. Jones '16, Buffalo Forge Company, Buffalo, N.Y.; A. Warren Norton '21, President, Press Wireless, Inc., 1475 Broadway, New York City; Edwin L. Rose '21, engineer, P.O. Box 751, Waterbury, Conn.; Clayton D. Grover '22, 303 West 10th Street, New York City; John L. Vaupel '22, manager, Phoenix Bridge Company, New York City; James Donovan '28, 211 Congress Street, Boston, Mass.; Earle D. McLeod '33, chemist, 55 Canal Street, Providence, R.I.; and Parvis A. Yekta '44, 48 West 43d Street, New York City. — WILLIAM D. NEUBERG '17, *Secretary*, 24 East 39th Street, New York, N.Y. WILLIAM L. KEPLINGER, JR., '24, *Publicity Committee*, care of Johns-Manville Corporation, 22 East 40th Street, New York, N.Y.

### *Washington Society of the M.I.T.*

On January 11 the Society enjoyed another of its wide-awake meetings at the Y.W.C.A. There were music, the meeting of friends, a good dinner, and a spellbinding speaker, who got more laughs from a serious address than we have ever heard of the Washington Club produce. Joe Gaffney '28 at the piano made a pleasant musical background while the fellows were gathering and renewing acquaintances. Musical emphasis continued through the evening with "Take Me Back to Tech" just before dinner and a quartet number immediately after. Later Harry Fisk '22 got the fellows to singing "Sons of M.I.T." in a lusty fashion.

The Hon. Josh Lee, former senator from Oklahoma and member of the Civil Aeronautics Board, presented an address stressing the importance of vision in the C.A.B. and the need for ability to "lead the target." He said: "Aviation is an infant yet, where the vision is great and the stakes are high. Our target is a fast-moving one, and if we shoot at it, we shall miss it. Our aim must be ahead of it." Senator Lee pointed out the sobering concept that confronts the C.A.B. today. The United States leads the world in aviation. It is the responsibility of the board to see that this position is not lost. A rapid-fire question period followed the formal address.

The following Technology men were present: 1889: G. W. Stone; 1890: J. G. Crane; 1891: W. B. Douglass; 1893: P. H. Thomas; 1896: W. E. Haseltine, Bradley Stoughton, G. E. Stratton; 1897: P. L. Dougherty, B. A. Howes; 1898: Martin Boyle; 1904: G. N. Wheat, G. H. Shaw, F. W. Milliken; 1905: J. A. Furer; 1909: B. A. Robinson; 1911: D. P. Allen, C. G. Richmond; 1912: A. M. Pedersen, R. E. Wilson; 1913: R. M. Wilson; 1915: A. D. Beidelman; 1916: W. H. Blank; 1917: J. P. Ferrall, A. R. Williams; 1919: A. H. Blake, L. J. Grayson, M. P. Smith; 1920: G. W. Anderson; 1921: L. W. Conant; 1922: H. H. Fisk, G. R. Hopkins, W. K. MacMahon, J. R. Morton, Jr., R. K. Thulman; 1923: H. L. Bond; 1924: W. V. Cash, P. C. Maynard, R. P. Schreiber, W. W. Sturdy; 1925: F. W. Cole; 1927: E. G. Cowen; 1928: A. E. Beitzell, J. W. Gaffney, M. W. Keyes, G. D. Mock; 1929: J. A. Plugge, N. P. Stathis; 1930: A. F. Bird, J. R. Bloom, C. W. Maskell, N. C. Nelson; 1932: W. H. Foster, F. M. Moss; 1935: B. D. Mills; 1936: G. D. Mylchreest, E. R. Pettebone, 2d; 1939: Charles Friedman; 1940: C. R. Haig, Jr.; 1942: Sutton Monro. — FRANK W. MILLIKEN '04, *Secretary*, 613 North Greenwich Street, Falls Church, Va. ALBERT F. BIRD, *Assistant and Review Secretary*, 5070 Temple Hills Road, Southeast, Washington 20, D.C.

## CLASS NOTES

### 1885

The old man with the scythe has again visited us; this time the victim is Anson Warren Allen, who was born on December 10, 1862, probably in Massachusetts, and died on December 25 at Birmingham, Ala. He was a chemical engineer by profession and was connected with the United States Steel Company for 47 years. In 1932 he re-

tired as assistant general superintendent of the Ensley Works of the Tennessee Coal Iron and Railroad Company.

I think I am correct in stating that no educational institution in the world had a course in electrical engineering prior to 1882, when it was initiated at Technology. This was the sophomore year for our Class, and seven men elected the new course. They all completed the four-year schedule, and William J. Hopkins, Frank A. Pickernell, Richard H. Pierce, and Charles M. Wilder were graduated. Two others, one from Harvard and one from Yale, took this course as postgraduate work but were not graduated.

An Alumnus writes: "Professor Charles Cross was the head and whole faculty of the Electrical Engineering Department. He filled us full of information as to the progress of physics and electricity during the previous inventive century, so that we became familiar with the historic names of Faraday, Thompson, Ampère, Volta, and all the others. He pushed into our heads the rudiments of the mathematics of physics and the theory of the construction of matter — which we have had to unlearn now that new discoveries have been made. He gave us recreation in the experimental laboratory, where we played with the Holz machine, a Thompson-Houston dynamo (direct current), and an old alternating-current machine of unknown make. But the chief thing we learned from Professor Cross was how to hunt for the truth, how to distinguish between possibilities, probabilities, and facts; and, most valuable of all, we learned logical habits of thought."

Several men of our Class have won distinction. I almost hesitate to name any for fear of omitting some, but the records of the following have come to my notice.

Charles R. Allen, V, S.B., deceased, was made an M.A. by Harvard in 1908 and in 1927 given the degree of D.Sc. by Stout Institute of Menominee, Wis. Dr. Allen was really the father of vocational training. After World War I, he acted for 16 years as consultant for the Federal Board for Vocational Education at Washington.

David Baker, III, S.B., deceased, won fame as the founder, manager, and president of the iron works of the Broken Hill Proprietary Company in Australia. In 1936 he was presented the Legion of Honor insignia and diploma of the American Institute of Mining and Metallurgical Engineers.

Frederick Fox, V, S.B., S.M., deceased, taught chemistry at Technology, and later took a postgraduate course in Germany, receiving a Ph.D. from the University of Leipzig. Upon his return, he was graduated from the Harvard Law School as an LL.B. (Note: As far as I know, Fox and Charles H. Bartlett were the only two men in our Class to become lawyers.)

Hammond V. Hayes, VI, VIII, was graduated from Harvard, from which he received his A.B., M.A., and Ph.D. He took postgraduate work at the Institute in 1884-1885. Dr. Hayes was for five years president of the Submarine Signal Company. He now has his own laboratory, developing new services along the lines of his past experience.

Arthur D. Little, V, deceased, could, I think, be called the father of industrial chemistry. He received honorary degrees



from the University of Pittsburgh, from Columbia University, from Tufts College, and from the University of Manchester in England. Dr. Little was president of two chemical societies in America and was one of the very few Americans to become president of the Society of Chemical Industry, of London.

Isaac W. Litchfield, II<sup>2</sup> VIII, deceased, inventor, upon his return from the West in 1906, revitalized the Alumni Association, was managing editor of *The Review* from 1908 to 1917, was a prime mover in the Association of Class Secretaries and in starting the Alumni Council, and was editor of *Science Conspectus*.

Richard S. Lull (II-S.M.A.), B.S., M.S., and honorary D.Sc. of Rutgers University, Ph.D. of Columbia University, and honorary M.A. of Yale, did postgraduate work for one year at the Institute. Dr. Lull became Sterling professor of paleontology and director, now emeritus, of the Peabody Museum at Yale University. He is honorary curator of vertebrate paleontology at the Peabody Museum, associate fellow of the Jonathan Edwards College at Yale, and editor of the *American Journal of Science*, New Haven, Conn.

Alexander R. McKim, I, S.B., deceased, received an M.A. from Columbia University and later studied at the Technische Hochschule in Berlin. (While in Germany, he became an expert student duelist.) In 1911 he was appointed to organize the New York State Bureau of Docks and Dams. In 1912 he wrote a code for dams which was adopted by the state of New York. He retired in 1927 and spent several years in Europe, before returning to the United States.

Tracy Lyon, II, S.B., deceased, while associated with a western railroad devised the tonnage method for rating the hauling capacity of locomotives. He designed the first Pullman club car. Later he was connected with the General Motors Corporation and still later became engineer adviser to the president of the Chrysler Motor Company.

Hugh MacRae, III, S.B., after many years of experimentation, has finally consummated a farm program which should benefit all farmers in the southern states.

Allyne L. Merrill, II, S.B., deceased, became professor of mechanism at Technology and secretary of the Faculty.

Everett Morris, III, S.B., deceased, as president of the Alumni Association, treasurer of the Institute for 11 years, a member and subsequently chairman of the Executive Committee of the Corporation for many years, was very active in Technology affairs and a great help during its critical period.

Frederick H. Newell, III, S.B., deceased, was the father of irrigation. He received an honorary degree of doctor of engineering from the Case School of Applied Science in 1912 and became founder and president of the American Association of Engineers.

Louis E. Reber, who took a postgraduate course at the Institute in 1883-1884, received his B.S., M.S., and D.Sc. from Pennsylvania State College, where he became dean of the School of Engineering from 1895 to 1907. From 1907 to 1926 Dr. Reber was dean of the extension division of the University of Wisconsin.

Charles R. Richards, II, S.B., deceased, was director of the school of science at

Pratt Institute, Brooklyn, N. Y., and later director of the department of manual training at Teachers' College at Columbia University for 10 years. From 1908 to 1923 Professor Richards was director of Cooper Union, New York. In 1925 Professor Richards was appointed by Herbert Hoover, then Secretary of Commerce, as chairman of a committee to visit and report on the Paris Exposition for the benefit of American manufacturers. In April, 1926, at the 20th annual dinner of the Art-in-Trades Club at the Waldorf-Astoria, Professor Richards received the Cross of the Legion of Honor of France from Maxime Monge, consul general in New York. The Michael Friedsam Medal for 1935 was awarded to him by the Architectural League of New York. The citation reads in part: "Distinguished educator in the fields of science and art, and notable for his constructive contribution to each."

Robert E. Richardson, II, deceased, did pioneer work in electrical construction in Chicago and in 1887, with two assistants, installed lights in the first Pullman car to be equipped with electricity. He built the first outdoor lighting system in this country for the World's Fair in Chicago. In 1915 he formed a rate department for the Electric Bond and Share Company, which he headed until his retirement in 1933.

Henry P. Talbot, V, S.B., Ph.D., Leipzig, Sc.D., Dartmouth, deceased, was professor of chemistry at Technology and for many years head of the Department of Chemistry and Chemical Engineering; he became chairman of the Faculty, chairman of the administrative committee, and dean of students from 1921 to 1927.

I have been Class Secretary for not quite 10 years, but the above is probably generally correct, "errors and omissions excepted," as the accountants say. —ARTHUR K. HUNT, *Secretary*, Longwood Towers, Brookline 46, Mass.

## 1887

One of the most severe blows sustained by the Class in recent years was the passing of our beloved classmate and dear friend, Albert L. Cushing, who passed away at the Brockton Hospital on last October 25; no notice was received from any source until the following announcement from his widow came some time later in this letter to the Secretary: "Feeling that you had not heard of Mr. Cushing's death and knowing how closely bound together were the lives and interests of the Class during 57 years, I called the Institute and secured your address. Bert, or Squash, as you called him, died on October 25 in Brockton while in the harness, an energetic and successful hustler all his life, beloved and honored by all with whom he came in contact. How he did enjoy your get-togethers, never missing them! He had had warnings to call a halt, but the goal was always just ahead. At last the shock came, and his left side was paralyzed. He was taken to the Brockton Hospital and there fought valiantly for two weeks for a comeback, but it was not to be. Our one consolation is that he did not have to go through the agony of living on disabled. My two sons and I have suffered a great loss, but the memory of our 55 years together is very precious to me. Please extend this message to each one of his Class, with best wishes for all."

For the past eight years Squash had been connected with the Barbour Mills in Brockton, Mass., to the managers of which he was devotedly attached. One of the latter has very kindly furnished a sketch, herewith appended, of our classmate's career with that concern: "We are very pleased to give you a little idea of what Mr. Cushing did while with us. As you can realize, in order to appreciate his services with us, it would be very necessary to have an understanding of his earlier work and his life from the very beginning. Before joining us, Mr. Cushing was with the United States Knitting Company in Pawtucket, R.I. He used to call occasionally to see me — trudging up the street with his coat open, full of the fight that has characterized all his activities, I imagine, since he was born. At first we talked and discussed the possibilities of commission work, and finally, after one thing had led to another, we hired Mr. Cushing in 1936. By his great energy and enthusiasm, he immediately made his own work in the mill, and his color and personality lent a charm to our activities for the next eight years until his recent death. He covered the Boston market for us and also had charge of the sale of off-goods and remnants. He was always willing to commit himself about any problem at any time, definitely and without any equivocation, whether right or wrong. Mr. Cushing seemed to grow in strength, courage, and happiness while with us, I am glad to say. He must have spent the last years of his life just as he wished. He was one of the grand old men of the old school in the textile field, and his unique, startling character will be missed by all of us, as I imagine it will be by all his classmates who are looking forward to Plymouth next June." The deep and heartfelt sympathy of the Class goes out to the family of our faithful and beloved comrade.

The following announcement of the death of Arthur C. Sprague on November 15 appeared in the *Boston Herald* of November 16: "The funeral of Arthur C. Sprague, 79, of 416 Belmont street, Wollaston, . . . was held at the Fay Funeral Home, 8 Old Colony avenue, Wollaston. He had been an architect in Boston for many years. He was a member of the Businessmen's Art Club, the Boston City Club and the Appalachian Mountain Club. He leaves a brother, Frank H. Sprague and a nephew, Waldo C. Sprague."

Arthur Nickels writes from Winter Park, Fla., where he is located at 358 Fairbanks Avenue, that he finds Winter Park as attractive as ever. (Your Secretary wishes that he could say the same of Salem in the prevailing sub-zero January weather!) He thinks it the best place in Florida for him as distances are short in a small place and there is a fine lot of people there. He says, however, that at present it is somewhat crowded. — It will interest members of the Class to learn that the 19 colored battle scenes which excited such admiration in the October number of the *National Geographic Magazine*, were the work of our old Class Treasurer's nephew, William F. Draper, a lieutenant in the Navy and son of George's younger brother, Clare. This information was furnished your Secretary by Mr. Fisher, in charge of the department of illustrations of the *National Geographic*, who very kindly got in touch with the

artist and secured the information requested, thereby winning the gratitude of the Secretary as well as that of the members of our Class.

In closing it might not be amiss to say that your Secretary sent the congratulations and best wishes of the Class to Emeritus Professor Robert H. Richards on the observance of his 100th birthday in August, last, and received a very appreciative reply in return. — NATHANIEL T. VERY, *Secretary*, 15 Dearborn Street, Salem, Mass.

### 1888

Sanford Thompson reports that one of the most interesting pieces of work upon which his firm, the Thompson and Lichtner Company, Inc., is engaged is the development of the General Edward Lawrence Logan Airport in East Boston. The procedure which was developed in this project is worthy of note. The company first made a thorough market survey, as it might be called, of the expected business of the airport for the next 10 years, involving estimates of passenger travel, cargo, and mail, both domestic and transatlantic. With this as a basis, it determined the requirements for concessions, space requirements of the operating airlines, hangars, and so forth, and from this total of needs, with the assistance of the associated architects, made preliminary designs of the structures. The report made by their management and technical divisions in combination covered some 300 pages and resulted in the award of a contract for the design of airport structures involving expenditures of some seven million dollars.

Charles P. Nutter was a man whose entire career was changed by his love for military pomp. He entered with us in the fall of 1884 and planned to become an electrical engineer, but he was so much interested in military drill by the seed sown three times a week in the old drill shed at the foot of Exeter Street, that he left at the end of his first year for a military life, joined the Massachusetts First Heavy Artillery at their armory on Columbus Avenue, Boston, and, although he worked as an electrical contractor during the day, was at the armory every evening attending to his more important military duties. Nutter's advancement from the rank of private was so rapid that in less than 10 years he rose to be a colonel at the head of the regiment, and in 1898 he was in command of all the defenses of Boston Harbor, with headquarters at Fort Warren, where we spent a day at the end of our freshman year in June, 1885. Colonel Nutter was born in Cape Elizabeth, Maine, and lived in Boston until the end of his military career, rating as honorary colonel of the Massachusetts First Heavy Artillery in about 1920, when he went back to Maine and remained on his big dairy farm in Scarborough, adjoining Cape Elizabeth, until his death on December 9. Admiral Peary, of Arctic fame, was an ancestor on his mother's side. Your Secretary attended district school with him in Cape Elizabeth when he was nine years of age. He was a jolly good fellow.

Herbert S. Bird, 38 Nugent Street, New Hyde Park, N.Y., has been one of our most faithful long-distance attendants at class dinners and reunions, but he is now living way out on Long Island and is not sure

whether he can make it next June or not. Here's hoping that he can.

George Roper, shipbuilder of Norfolk, Va., is our best correspondent; your Secretary received two letters from him in December only three days apart! He has a complete woodworking shop at his summer home in southern Pennsylvania, where he made a complete set of dining-room chairs elaborately carved. He intends to send me a photograph of them, which I will pass along to any classmates on request. George's second letter, of December 17, is of such general interest to every member of the Class that I include it here: "I have lately received the report of our President, Dr. Compton, for the year 1944, outlining past activities and proposing new progress. I have read every word of this scholarly presentation, which should be a great stimulus for all of us who are interested in the Institute, and I found it both interesting and convincing; but I presume you have read it and perhaps had the same reaction that I did. I will not attempt to refer to many of the suggestions, all of which impressed me very favorably. I was forcibly struck, however, by one statistical item showing that out of 8,853 Alumni contributing to that Fund, only \$115,534 was received, or an average contribution of about \$13 per member. Very many, like myself, have been away from the Institute for many years, and are thus out of touch with its needs; but if an appeal were to be made asking each member of this group to double his subscription in 1945, I believe it would result in raising the Fund to double the amount shown for 1944. Personally, I doubt that I would stop at doubling my own small amount, which, I confess, I have not taken seriously. I have been watching the trend of our class notes, and those of the years preceding ours, and observe that we have now nearly reached the end of the line, with only a very few antedating us. Soon our Class will be the real antiques and notes of interest become shorter and shorter; but I trust it may be able to carry on for many more years. The Class of 1874 should be a shining example!"

Fred Ellis, our champion boxer and quarterback, admits that he is a poor correspondent, having required two years to answer my letter of December 22, 1942. His letter of December 21, 1944, has just been received via Beachwood, N.J., and St. Petersburg, Fla. As Fred never misses a class dinner or a five-year reunion, I think all 57 of our classmates who read our class notes (I hope) will be interested in what he has been doing during the last year, as revealed in that letter: "I went out to see Eastman in August and found him with his smile, but not so cheerful a one as usual. His only grandson had been killed shortly before in a plane collision at a camp down south. It was his final flight before finishing his training. He was the last male in Eastman's line with no chance of any more. Eastman still drives his 'Model T' to Lowell twice a week to attend to some family business. After my gas ration A becomes usable, I will drive out to see him again. Bates, Hamblet, Runkle, and the others at the get-together at the Engineers Club in June were all in good spirits, but somehow they all seemed to have aged a good deal in the last year, except Runkle. We miss you so much; the meetings lack a

good deal when you are absent. I haven't seen Webster since the 1943 reunion.

"The day that Foque was buried I went to the Baker Memorial Hospital and remained five weeks, really enjoying my stay. It was the longest time in 47 years that I had occupied one bed, and I did not feel like moving around much until August. All I did was putter about in the flower garden. I sold my house in Melrose and moved out on July 27 of this year. It was a hard thing to do, but my conscience was bothering me for having that large house for one person (there but half the time) and his housekeeper, when there was such a housing shortage in the metropolitan area. I am glad to see the house in real use again with a baby carriage on the piazza. My official residence is at my sister's, 26 Winthrop Street, Melrose, Mass. I spend about two weeks a month at Melvin Village, N.H., with Margaret, then a couple of days in Melrose, then over to Katherine's in Wellesley; then reverse and repeat. I have one room in Melrose, two in Melvin, and two in Wellesley all to myself and have all the necessities at each place so that I don't even have to carry a bag. I would go south this winter if transportation needs should let up. I have taken some pictures of the farm and my activities there and will send them under separate cover as soon as I get the notes on the back of them. Six inches of snow here — 10 above — nice, clean, and brisk. I shall be here till after Christmas and then go the rounds. You know that in a football game if a team goes into a huddle between plays and instead of talking signals they talk of how they are going to celebrate the winning of the game, they may be penalized five yards for taking too much time out between plays. I wouldn't run a war that way."

Henry Bates sent me the best kind of a Christmas card, a fine photograph of his ancestral mansion in Carlisle, Mass. I hope you all received one, too. It looks like a great place to live. Stella and Sanford Thompson also sent a beautifully worded letter to all of us for which we are duly grateful. — BERTRAND R. T. COLLINS, *Secretary*, 39 Wiggins Street, Princeton, N.J., SANFORD E. THOMPSON, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., 620 Newbury Street, Boston 15, Mass.

### 1889

The Secretary wishes that more of his classmates would write to him now and then. Since his own private grapevine is a war casualty and his television set out of order, he has to depend on what he sees in the papers for news, or on what someone sends in. As everyone knows, what the papers carry about us old gaffers is mighty little at present (on account of pulp shortage, of course). Here is something from Zenas Bliss, however, which is too good to keep quiet: "Your card arrived in due time, and your thoughtfulness was sincerely appreciated and made Christmas that much the merrier; it also reminded me that I had threatened to drop in and pay you a call during the summer. I did not forget the threat, but a concatenation of events made its carrying out impossible — shortage of gas, no chauffeur, shortage of help, and the consequent necessity of attending in person to a lot of office detail, an activity which I had thought eliminated from my curricu-



lum some time since. This situation kept me confined closely to the office all summer; we didn't even get to our summer place. This is my excuse and reason for not keeping my word.

"You will note from the date lines [Alexandria, Va., December 28] that I am wandering about the country again. For a few days I am visiting my son and his wife. He has some sort of an assignment at the War Department, and we interrupted our journey to Texas to spend the holidays with him and his family, or such of it as he happens to be fortunate enough to have with him just now. I had intended to remain at home this winter, but the tribal medicine man put a mild veto on that; not that there was anything in particular the matter, except a childish tendency to take cold, and, as I had such affairs as I still have to worry about in good enough shape to be left in the hands of my agents, the said medicine man thought it wise for my wife and me to get into a more salubrious climate than that of New England during the winter; hence we are on our way, emulating Ponce de Leon in search of the elusive fountain. I have no news of interest concerning myself, or anyone else for that matter. We are located a few miles from the capital of the Land of the Brave and formerly Free, and it is, under present conditions, some town. I have not been in Washington for 10 or 12 years, and the changes are noticeable, to draw it mildly. As you have probably been here more or less recently, I shall not go into details; but it is quite evident, even to a casual observer, where some of our exorbitant taxes went and are still going and will continue to go for some time; I am informed, however, that you can get used to anything, if you live long enough."

Howard B. Emery is another member of the Ponce de Leon Club. His address is 754 Fifth Avenue, North, St. Petersburg, Fla. Ed Marsh has also been heard from, giving his address as Box 262, Northampton, Mass. The Secretary himself is still grinding away at his office, largely on postwar projects, of which there are a great many. No coral strand stuff for him. — WALTER H. KILHAM, *Secretary*, 126 Newbury Street, Boston 16, Mass.

## 1891

Alonzo J. Hammond died on December 1 at the hotel in Washington, D.C., where he was living. Although he was identified with our Class, he was with us for only a short time. The following is from the *New York Journal and American*: "Alonzo John Hammond, 75, eminent engineer who built Chicago's \$75,000,000 Union Station, was found dead . . . in his Washington hotel apartment. Mr. Hammond, who was president of the American Society of Civil Engineers in 1933, had been working here for four years in the price adjustment branch of the War Department's Engineer Corps. His duties also included those of consulting engineer in the construction division of the War Department on all field operations; membership on the construction contract board of the War Department's construction division and membership on the advisory commission of the Army and Navy Munitions Board. Prior to coming here his home was in Evanston, Illinois, with offices in Chicago. Mr. Hammond was born in

Thornville, Indiana, April 23, 1869. He studied civil engineering in the West and then attended Massachusetts Institute of Technology for graduate study in 1891. He was city engineer of Frankfort, Indiana, and was associated with various railroads in the West until 1910 when he became a construction engineer in Chicago. His activities in Chicago included the building of several bridges and harbors, viaducts and hydroelectric plants, besides his work on the Union Station. He was also associated with the Mellon-Stuart Company in 1926-1927 as representative of that group in negotiations for \$130,000,000 internal improvements in Cuba."

Our 53d annual class dinner was held at the Algonquin Club in Boston on December 3. True to our traditions of informality and good cheer, it was a most enjoyable affair. The new suite assigned to us was quite luxurious and precisely the right size for our party. The table was set for 15 and exactly that number showed up, including our honorary member, Horace Ford. One other honorary member, Harry Clifford, had expected to come but was under the weather and at the last moment had to send regrets. Class members attending were Barnes, Bowen, Bradlee, Brown, Cole, Damon, Dana, Fiske, Holmes, Howard, Ryder, Tappan, Wilder, and Young. Clark accepted but was housed with a cold. His permanent residence is now on Ledge Road, Gloucester, Mass., which has been his summer home for many years. Reply cards were received from about 30 others, accounting for almost all on our active list of about 55. These cards sent greetings, good wishes, and regrets, and in almost all cases distance or sickness were the reasons for not attending. These cards included Kimball, Hersam, and Garrison on the Pacific Coast, Hanington in Denver, Moore in Hoopeston, Ill., and others not so far away. White and Walker had already left for their winter homes in Florida. Steve Bowen was leaving soon for Winter Park, Fla., and during the dinner was trying to sell the idea to Lin Damon. It was nice to see Barnes again as he was not able to attend a year ago, also Channing Brown, who never misses our parties if he can help it. Francis Holmes came from Plymouth and looked in fine fettle; so did Morrill Ryder, who lives in Middleboro, and Harry Cole from Weymouth. Harry says it was a bad year for cranberries. The rest of us hadn't far to go so have no excuse and don't want any.

Horace Ford gave us some information on the Alumni Fund in answer to Harry Young's question about what the money was for. It appears that they are letting the Fund accumulate until such time as needed, and subject to joint control by the Institute and the Alumni Fund Board. We stand high in number of subscriptions, but not so well on average amount subscribed. Let's increase our amounts in 1945. Horace also told us about the plans for a Technology library building to be located between Walker Memorial and the main buildings, with underground passages to each. This will be the last word in an engineering educational library with most up-to-date facilities for finding what you want when you want it with least possible delay. To wind up the festivities, Frank Howard showed some colored motion pictures taken last

summer in Glacier and Yellowstone parks. He is an artist and an expert in this work; some of the movies of geysers, pools, and "hot spots" in the Yellowstone were voted the finest we had ever seen. He later showed colored and black-and-white films of our 50th reunion and previous five-year reunions, including our party at Aiken Manor, Webster Lake, N.H., in 1935. These were taken by Gorham Dana and Charlie Aiken. Our thanks go to Harry Young, who took care of all arrangements at the club. The best wishes of the Class were transmitted by telephone the next day to Harry Clifford and Howard Forbes, both unable to attend on account of illness, and by letter to Clark, who had expected to come.

The following appeared recently in a Plymouth, Mass., paper: "Gift of 20 acres of land in Plymouth, Mass. for the purpose of 'preserving for all time the view of historic Plymouth Harbor,' was announced today by the Trustees of Public Reservations, a private organization of Massachusetts, which received the land from Francis C. Holmes and his sister, Miss Helen W. Holmes. A suitable endowment accompanied the gift for maintenance, the Trustees announced, and the tract is to be known as Holmes Reservation and suitably marked."

At last we have heard from Charlie Ricker, who wrote from Havana on November 28. His letter ran in part thus: "I received your announcement of the Class Dinner on December 1 before leaving Salamanca, N.Y., where I spent the summer, but was then so busy with preparations for the trip to Havana and related matters that I neglected to reply. I did not enjoy last summer. I left Havana on May 1 and had to live under doctor's orders, with restrictions on diet and activity in general that spoiled all the fun. On October 17, however, I received a clean bill of health to travel back to Havana for the winter. We decided to sell the farm, which I blame for most of the trouble — too much work and responsibility. I went to Washington for a little visit with the family and by telephone had a proposal of purchase which I accepted. Now son Charles must finish the deal as I landed in Havana on November 15. I had to default on the project to climb Mt. Washington on my 75th birthday, but am doing the best I can to be in shape to tackle it next July.

"The weather here is very nice and not too warm, and from my bedroom windows I can look at sunrises and sunsets that you would like to photograph. I live in an old-fashioned boardinghouse where all the other guests are junior employees in the American and British legations and the Englishwoman who runs it is past 80 and still going strong; hence the surroundings are as cheerful as one can ordinarily find. Havana and the surrounding country suffered a great deal of damage in the October cyclone, which fortunately turned out to sea before it reached your latitude, unlike that of 1938, which you must remember. This one spoiled many buildings and trees and plantations in Cuba and Florida, but took few lives. I am hoping to see you all next spring or summer."

Ed Earl writes from Leominster, Mass., as follows: "I have put off answering your card regarding the class dinner in the hope that I could see my way clear to attend,

but it does not seem very practical for me to do so. I am in pretty good health, although they insist that I shall not shovel snow or mow lawns. I still keep quite busy in a one-man way by making stains for plastics and dealing in machinery used by the plastic and woodworking trade. I have been a fairly constant attendant at the meetings of the Worcester County Technology Club and often meet Carleton Read there."

Will Leland wrote, before his death, as follows: "I am sorry not to be able to meet with the Class for the annual dinner, but you are all too far away, and we are still busy with housing, Army, and Navy work, and while this engineering has so many ups and downs we can't leave it for very long. I talked with Hersam over the telephone a few days ago. You have probably heard from him since then. In spite of the fact that we are so close geographically, we see very little of each other. Please remember me to all the class members present. I still have very pleasant memories of our good time three years ago."

Walter Douglass sent Christmas greetings from Washington giving his new address as 506 King Street, Alexandria, Va. He wrote on his card: "I have fully recovered from my troubles of the summer, and am busy again at Fort Belvoir. I am going to a meeting of the Washington Society next Thursday evening. Cheerio!" — Steve Bowen writes from Virginia Inn, Winter Park, Fla.: "Since coming down, I have seen Walker and his wife twice. Neither of them is very well, and as they could get no maid they have gone to a hotel near their place. I think I have written you before that Ambrose has a very pretty bungalow on one of the small lakes. He did much of the interior decorating of the living room himself; he has a flair for that sort of thing. When I first came down, it was quite cold; for the last 15 days it has averaged 56 degrees at 8:00 A.M. and 71 degrees at noon — not too bad. You had better come down and sit in the sun the way an old fellow should." — A note from Will Wilder reads: "Marcia and I have just returned from a holiday visit to Rachel and family in Longmeadow. Yesterday we had a visit from our grandson, Philip, Jr., who is a lieutenant in the air service, now stationed at Foster Field, Victoria, Texas. He returns today, stopping off to see his parents in Lexington, Va." — HENRY A. FISKE, *Secretary*, Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I.

### 1893

The retirement of Henry Windsor Nichols, effective December 31, as chief curator of geology at the Chicago Natural History Museum has been brought to our attention by Richard E. Schmidt '87. After serving for one year (immediately following his graduation) as assistant in the Department of Geology at the Institute, Nichols was appointed assistant curator of economic geology at the Field Columbian Museum of Natural History and successively filled the positions of associate, acting, and chief curator of geology until his retirement after 50 years of service. Few men are ever privileged to serve continuously in their chosen occupation over such a long period.

The following notice appeared in the New York *Herald Tribune* for February 1:

"Dr. Augustus B. Wadsworth, director of the division of laboratories and research of the State Department of Health, retired . . . after thirty-one years of continuous service. He was appointed in charge of laboratories and research for the state on Feb. 9, 1914, when the laboratory included nothing more than a converted stable and a frame dwelling and a staff of seventeen persons carrying on limited services. Under his direction the laboratory has grown into a modern institution."

Evidence that George Glidden's interest in public affairs extends beyond his home town of Dighton, Mass., where he served as chairman of the board of selectmen over a period of 27 years, ending in 1941, is borne out by his appointment by ex-Governor Saltonstall to the board of trustees of the Bristol County Agricultural School and his election to the corporation and board of trustees of the Taunton Savings Bank. For six years he has been president of the Massachusetts Memorial Hospitals, and he has recently been re-elected for another term of office.

We are pleased to report the marriage of Fred Fay's daughter Betty, a graduate of the Museum of Fine Arts School in Boston, to E. Dudley Goodale, a graduate of Union College, who took graduate work at Technology with the Class of 1930. The wedding was held at the Meeting House Hill Church in Dorchester, on January 28. Mr. Goodale is associated with the National Broadcasting Company in New York, and the new home is at 184 Woodland Avenue, New Rochelle, N.Y.

In spite of the fact that considerably less than 50 per cent of the Class has ever supported the Alumni Fund, we have exceeded by 116 per cent, as of December 31, the amount set up for our quota in the 1944-1945 campaign. For those who have not yet subscribed, there is still time to do so before the books close on March 31. — FREDERIC H. KEYES, *Secretary*, Room 7-211, M.I.T., Cambridge 39, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, 551 Tremont Street, Boston 16, Mass.

### 1895

There is nothing to report at this time. My news files are all cleared to date. I shall patiently wait to hear of your further doings. Please do not forget to write, once in a while. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

### 1896

Although a little late the Secretary wishes to express his pleasure for receipt of Christmas greetings from Allen, Bakenhus, Hersey, Jacobs, Lythgoe, Melliush, Rockwell, Rutherford, Sager, Tilley, Tucker, and Wayne.

December 20 was a day to be remembered because during the forenoon Butler Ames called on the Secretary to discuss a problem in enameling for which the Secretary referred him to Professor Frederick H. Norton '18, specialist in ceramics. Butler reported that he was working every day and, living on Beacon Hill in Boston, he was a daily commuter back and forth to Lowell. So far he has been unable to learn anything regarding the fate of his villa in Italy. In the afternoon of that day Joe Harrington appeared. He had come to Wenham with Mrs. Harrington on December 15 to

stay until January 4 with his son Joseph, Jr., '30 and the grandchildren. Joe is busy with his independent consulting work for the Northern Illinois Coal Corporation in Chicago, and he also writes publicity material for the campaign to save fuel. He is putting out the Harrington domestic stoker heater and the Harrington tubular boiler for domestic heating and commercial steam raising. These are new things in addition to his old stoker business, which he still carries on. Joe is a free lance in that he works entirely independently of any prescribed hours; he goes and comes to his office when he pleases, and works as hard and rests as much as he desires. Closely connected with the visit from Joe was a letter from Lou Morse in January, enclosing tear sheets from the December issue of *National Engineer*. These tear sheets contained an article by Joe on "Practical Suggestions on the Elimination of Fuel Waste" and had an excellent photograph of the bewhiskered Joe as he is today, together with his professional biography. This biography stressed that Joe is one of the outstanding authorities on boiler plant operation in the country, having taken a great interest in boiler plant equipment from the time of his graduation. Green Chain Grate is mentioned as his first major accomplishment, which was followed by the stokers and boilers mentioned above. He has served in a consulting advisory capacity to many organizations. During the first World War he was administrative engineer for the United States Fuel Administration, and he has been an advisory engineer in power plant design, operation, and efficiency; a member of the Bituminous Coal Code Authority; a member of the technical advisory board of the Chicago Smoke Department; advisory engineer for the Commercial Testing and Engineering Company; advisory engineer for the United States Army Coal Conservation Program; member of the advisory council of the Bureau of Mines Efficiency Program and chairman of its publicity committee. He has been a prominent popular lecturer and writer on his specialty. He acted as reviewing editor of the Hays Combustion Course textbooks and wrote the book, *The Burning of Coal*. Joe is an honorary member of the National Association of Power Engineers and belongs to a large number of engineering and scientific organizations. In February, 1940, he was among the recipients of the Modern Pioneer award from the National Association of Manufacturers.

Hersey has supplied the information that his son has now completed his premedical work in the United States Army and has been assigned to the medical department of the University of Louisville for his medical course. A recent letter from Myron Fuller to Hersey reported that the former was planning to come home from Rockport, Texas, in April or May, but that because of the gasoline limitations he would have to follow the rather strange procedure of traveling by train and shipping his automobile back to New England by freight.

Charles P. Lynch, who had become lost, was recently relocated by the Secretary at 2 West Street, Haverstraw, N.Y. George S. Bowes has moved to 1240 Manor Park, Lakewood, Ohio. Julius F. Gayler is no longer maintaining his office in New York City, but has now retired to his home at



275 Fisher Avenue, White Plains, N.Y. A recent letter from Leighton in Washington tells of his enjoyment of the class dinners that have been held there and says that he is busy and continues so healthy that he feels it is almost downright unreasonable.

From Gretchen Palmer, Secretary of the Class of 1918, comes the report that the two sons of our late classmate W. H. Thomas are both in the service. Master Sergeant David Thomas is now a gunner on a Liberator of the Ninth Command with many missions to his credit over Germany, flying from fields in both England and Belgium. Ensign Edward Thomas is at present in Honolulu preparing to go into the western Pacific to set up an advance fleet post office. Mrs. Thomas is still carrying on the St. Christopher School in Westfield, N.J. Albert D. Hatfield is now at 14610 Terrace Road, East Cleveland 12, Ohio, and Edward A. McGonigle has moved from Birmingham, Mich., to 9594 Northlawn, Detroit 4, Mich. From Percy Waller of the Rochester section of the American Society of Civil Engineers has come a fine biographical record of our late classmate, Howard Everett Smith, a member of the A.S.C.E. who passed away last June.

Rockwell, along with Mrs. Rockwell, attended an illustrated lecture by Gene Hultman in the Boston Museum of Fine Arts on January 24 and reported that Gene, in his capacity of Metropolitan District Commissioner, gave a fine talk along with his movies of our metropolitan parks around Boston. Incidentally, Gene has been quite a bit in the public eye of late because of the fact that the switch of Massachusetts into the democratic ranks at the fall election made it practically inevitable that when Gene's term of office as Metropolitan District Commissioner ended in January he would be replaced by a democrat. Some reporters have proposed that Gene become a candidate for the mayor of Boston. Gene has done a splendid job as Metropolitan District Commissioner, and it seems very unfortunate that politics should prevent the city from continuing to make use of his services. One of his outstanding accomplishments has been the creation of the Quabbin reservoir and his plan for linking into the Metropolitan District various suburban districts around Boston, which would have the effect of cutting down the cost of their water systems.

Professor Jacobs took time off after Christmas to visit Boston, and the Secretary had the pleasure of his company for two days during the holiday week. Following that he spent a week with his sister in Brookline, N.H., experiencing some real winter there, so that he was practically snowbound in the country until after the beginning of the new year. At last reports he was back in Burlington, Vt., where he said that winter still continued with plenty of snow and low temperatures.

Bill Dorrance has had some correspondence with G. M. Leghorn, the new manager of East Bay Lodge in Osterville, with the result that tentative reservation has been made with Mr. Leghorn for the observance of our 50th anniversary there in 1946. All of this is of course dependent upon the outcome of the war and the travel and living conditions next year.

The meeting of the New York classmates as arranged by Admiral Bakenhus at the

President Tavern for February 20 will be history by the time these notes appear in print. This meeting has meant quite a bit of pleasant correspondence between the Secretary and Bakenhus, Sager and Tilley. Incidentally, Sager passes along the information that he is not working too hard these days and has actually refused to take over a number of legal cases in order to avoid overdoing. He has reached the frame of mind where he is content to run a one-man office and have the pleasure of doing the work himself rather than employing assistants, with the worries and responsibility of overseeing their work. His health has been splendid all through the year. One thing Bakenhus reported was that he sent George L. McElroy a card which had been returned marked "deceased". The Secretary is seeking further information in this case and will report on results in a later issue.

A card from Walter Stearns at Pinehurst, N.C., dated January 26, stated that he and Mrs. Stearns had been there for two weeks having lots of golf and bridge and no cold weather. They were stopping off in Pinehurst on their way to Florida according to their usual custom.

John S. Hallaran passed away in Toledo on January 24. After his graduation in Course I John sojourned with Charles Williams '95 in Phoenix, Ariz., for two years before he established himself in Toledo. There he was for many years vice-president of the Dime Savings Bank and Trust Company and director of the Ainsworth Shoe Company. In recent years he has been retired, and it was his custom to spend some time during the summer in New England, with the result that since 1916 he became a pretty regular attendant at our class reunions, where we all enjoyed him and his quiet, retiring manner. He is one of our men who will be much missed. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge 38, Mass.

#### 1897

George H. Bliss, I, retired, died suddenly in Newburyport on November 28 at the age of 69. For many years after leaving the Institute, he had held the position of supervising engineer in the United States Reclamation Service and was located in the states of Washington, Montana, and Idaho. After his return to Newburyport he became associated with his brother in the Bliss and Perry Company, shoe manufacturers, later becoming treasurer of the firm. He was a director of the Merchants' National Bank and a life member of the American Society of Civil Engineers. He leaves a daughter, one grandson, one brother, and three sisters.

Nathan C. Burrill, I, died at his home in Newburyport on May 26. No further details have been received. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

#### 1899

Probably most of the Class remember David Carroll Churchill. He started with 1897 but was out two years and was graduated with us. Since then he has been missionary, airplane designer, and physics instructor. During World War I, Churchill

worked at the Garwood-Brown aircraft plant with Captain J. V. Martin and helped design the Martin bomber, two other Martin planes, the first automatic pilot, and the first retractable landing-gear system. In recent years he has perhaps been better known as the president of the Churchill Weavers of Berea, Ky. But when World War II broke out, this was not a colorful enough life for David, so at 72 he had to get into war work again. According to the magazine section of the *Dayton Journal-Herald* for December 3, David went to that city in 1942 and got a job with the Air Technical Service Command at Wright Field. About that time the Japs had moved into the Aleutians and the Germans into Greenland. Our planes had to take off from Alaska and Newfoundland. In such latitudes planes frequently developed, before they could take off, a load of 250 pounds of frost, resulting in their being kept on the ground. David solved the problem by inventing a slip cover, according to the article, which had a quick release system operated by jerking a hand line. That sounds like David.

The Bethlehem Steel Company has to have good men in order to make good steel. F. C. Waddell joined their staff in 1936 and W. A. Hazard in 1923. Waddell went with the Hay Foundry and Iron Works of Newark, N.J., in 1916, first as chief draftsman and then as chief engineer. In 1931 this plant was taken over by Bethlehem. Five years later Waddell went to Bethlehem. He says he expects to stay until victory is won, which is the right idea. W. A. Hazard is two floors below Waddell in the same building. Hazard is in charge of fabricated steel erection. This work includes bridges as well as all types of buildings. He was originally with the Lackawanna Bridge Company until it was taken over by Bethlehem in 1923. Waddell makes the suggestion that, since our 50th anniversary of graduation seems a long way off, we hold a Victory Year reunion when the war is won. It looks as if Waddell were an optimist. Maybe he is right. I hope so.

Ninety-nine didn't do so badly in contributions to the Alumni Fund. The percentage of the class quota of contributors was 100, as of December 31, and the percentage of the Class contributing was 108. This is good; but some other earlier classes did better. — ALLEN LOOMIS, XIII, writes from 915 East Beardsley Avenue, Elkhart, Ind., extending congratulations, but failing to give any account of himself. Come again, Allen, and make it specific.

And now a note of sadness. Word has arrived of the death of Leonard H. Field, Jr., in Jackson, Mich., on August 29. Leonard was a graduate of Amherst College, '96, and then joined the course in Architecture at the Institute. He worked for Peabody and Stearns, Boston, until he went abroad to study in 1903. Upon his return he established an office in Jackson, Mich. He designed many public buildings, including two churches and the Y.W.C.A. and Y.M.C.A. Retiring in 1933, Leonard became active in civic affairs, being at various times a member of the school library board, the school board, and the zoning commission. He is survived by his wife, two daughters, and a granddaughter. In the words of a friend, "We feel much blessed for having known him and his

gentle, radiant, good thinking, with all its strength and usefulness." — BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston 9, Mass.

## 1900

Many thanks for the dozen Christmas cards sent in by various well-wishers. Plans are progressing for the June anniversary and most expressions so far received are enthusiastic. If you have not already written in, may we not hear from you?

The sympathy of the Class is extended to Fitch, whose wife, Barbara R., passed away on January 22 in Cambridge. — Notice has just been received of the death on May 11, 1943, of William R. Allen, Jr., V, at St. Louis, Mo.

Nat Rand of Wilmington, Del., writes in as follows: "My good friend Cotting, it was indeed thoughtful of you to send me that 1945 calendar of 'Covered Bridges of New England.' I appreciate it. It contained bridges that I do not have in my collection. That is one calendar that will be kept after 1945 is gone. Again thanks, and may the joys of the holiday season be yours in abundance."

A nice letter was received from Harry Osgood in Culpeper, Va. He is no longer in Washington, having holed in for the winter on his farm. He raises nearly everything, hence has no worries about supplies. He sends in a letter from Sumner Manley, who is recovering from a serious operation and staying with his son, Jack, at Yorktown, Va. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston 9, Mass.

## 1901

A card from Willard Dow announces that after four years with the United States Army Corps of Engineers, the Ordnance Department, and Charles F. Rittenhouse and Company, he has resumed the practice of public accounting in Room 601, 50 Federal Street, Boston, Mass. — A note from Joe Catlin states that, in addition to being vice-president of the Wood Newspaper Machinery Corporation, he is a director of the Phelps Can Company in Baltimore, Md., and a director of the Wood Nathan and Virkus Company in Racine, Wis. This company is engaged in the manufacture of fractional horsepower motors for the Air Forces and precision parts for airplane propellers. — The Wood Newspaper Machinery Corporation has for some time been occupied in the manufacture of machine tools used in the production of airplane engines and propellers.

Allen McDaniel has retired from active business as a consulting engineer in Washington, D.C., but has been serving as consultant on special projects for the Virginia State Highway Commission and War Department Manpower Board. He writes that he is living in the remodeled Fairfax Quaker Meeting House at Waterford, Va., and operating a 142-acre farm in Loudoun County; also, that he is vice-president of the Catocin Farmers Club and the Waterford Foundation, Inc., the latter engaged in the restoration of Waterford, a Quaker village founded in 1730. He has also taught an Engineering Science and Management War Training course at George Washington University for the last three years. — Stuart Miller has retired but is serving as

chairman of the Marquette County Price and Rationing Board, treasurer of the finance committee and of the Trust Association of the diocese of Northern Michigan, and vestryman of St. Paul's Church in Marquette. He averages about four hours a day on the ration board work.

Donald Kohr, V, president of the Lowe Brothers Company in Dayton, Ohio, manufacturers of paints, varnishes, and lacquers, is also vice-president of the Lowe Brothers Company, Ltd., of Toronto, Canada, director of The Sherwin Williams Company, Cleveland, Ohio, and a member of the executive committee of the National Paint, Varnish and Lacquer Association, Inc., of Washington, D.C. In a short letter he says: "Unfortunately, I have lost touch with the friends I made while at Technology, perhaps in part because I was so busy trying to keep from flunking out that I did not have much time to cultivate friendships. I spent only one year there. There are a number of Tech men in Dayton but none of the Class of 1901, and it has been many years since I have seen any classmate." — A Rochester, N.Y., newspaper article states in part that Charles K. Flint, Vice-president of the Eastman Kodak Company and general manager of the Kodak Park Works, was elected on January 15 a director of the Kodak Company to fill a vacancy caused by the death of Albert F. Sulzer. — GUY C. PETERSON, *Secretary*, 788 Riverside Drive, New York 32, N.Y. THEODORE H. TAFT, *Assistant Secretary*, Room 3-266, M.I.T., Cambridge 39, Mass.

## 1903

During the past two months brief notices have been received of the deaths of Asa E. Goddard in Cambridge on December 2, and that of Kenneth DuBois Jewett in Boston on November 28. We had not heard about Goddard for years, but Jewett had attended several reunions in the past 15 years.

Through the office of Professor Locke we learn that Walter M. Drury, who has been with the American Smelting and Refining Company ever since graduation, has been made vice-president of the company. He has been general manager of the Mexican metal mining department since 1912. — Your Secretary has lately returned from an extended stay in Mexico, where he saw the new volcano which grew up almost overnight on the farm of a very much surprised farmer. He says it is still active and a most interesting thing to observe. — H. S. Morse calls our attention to the winning of the 1945 award of the Moles by William V. McMemimen for outstanding work in his particular field, that of concrete pile foundations. The last time your Assistant Secretary saw Mac was in 1917, when work was being done in Springfield for a steam plant on which we were working. We join in congratulating him.

Notice has been received of a midwinter meeting on February 26 which should be attended by many members of the Class. Don't forget the Alumni Fund — add to it if you can — and don't forget that your Secretaries need notes and information of interest to the Class, if you want to see us on these pages. — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston 9, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, 441 Stuart Street, Boston 16, Mass.

## 1907

Gifts, both solicited and unsolicited, of items of news from members of the Class during the Christmas and New Year season, were just about zero, with the result that for the first time in years we had no class notes in the February Review, and, as you see, the notes in this present issue are not up to our standards as to quantity.

In mid-January, in response to a request from the M.I.T. Advisory Council on Athletics, Harold Wonson, our Class Treasurer, sent \$25 as our class contribution to this group of Alumni, who do such a fine job in assisting undergraduate athletic activities. Harold, by the way, is now treasurer of Commonwealth Shoe and Leather Company in Whitman, Mass. He reports that the Wonson family are all well. The husband of his older daughter, who was in the south Pacific for nearly a year and went ashore on Guam with the invasion forces, was ordered back to this country last September for instruction at Princeton University in the Allied military government of occupied territories. He completed his course on January 27 and expected to be sent (quoting Harold) "to some unpronounceable location in the Pacific, presumably, to be the mayor or chairman of the board of selectment, or some such office, somewhere in that territory."

A portion of a page from the Butte, Mont., daily *Post* of December 19, thoughtfully sent to me by Carl Trauerman, has a large cut of a fine-looking girl, formerly Leslie Carolyn Jaccard; since December 8, Mrs. John J. McGee. She is the daughter of Fred Jaccard, 1201 West Steele Street in Butte. Fred is mechanical superintendent of the Anaconda Copper Mining Company. — A copy of *El chem*, published in the interests of the employees of the electrochemicals department of E. I. du Pont de Nemours and Company, came to me during January from Frank MacGregor, who is general manager of this department. A printed holiday message from Frank, together with a very fine picture of him, featured one page.

A letter dated January 2 from Bob Rand reached me during January. Bob is in the Hawaiian Islands. I should like to quote his message, but he says that the letter is not for publication. His address is Lieutenant Commander Robert Rand, U.S.N.R., Executive Department, U.S.N.A.S. 28, care of Fleet Post Office, San Francisco, Calif.

According to word received from Jim Barker late in January, Addison Miller died on September 7. I do not know the circumstances. A graduate in Mechanical Engineering, Addison entered the contracting business and for many years had been president of Addison Miller, Inc., railroad contractors; president of the Great Northern Icing Company, railroad icing facilities; and president of the Commercial Investment Company, investments, with office at 1111 Minnesota Mutual Life Building, St. Paul, Minn. He had never married. — Jim Barker's address is now 20 North Wacker Drive, Chicago 6, Ill. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1908

The second meeting and dinner of the 1944-1945 season was held at the Univer-



sity Club in Boston on January 9. The attendance was not so good as usual, but we did have a quorum, made up of Myron Davis, Joe Wattles, Harold Gurney, George Belcher, Sam Hatch, and Nick Carter. Linc Mayo and Goldthwait had expected to come but at the last minute couldn't make it. We had an excellent dinner and talked over what was new in news of the Class. Joe Wattles showed a very interesting colored sound movie supplied by the Greyhound Lines, which covered most of the United States from coast to coast. Our absent brothers missed a fine picture. Myron Davis showed us some of the black-and-white pencil pictures which he drew at the art class he is attending this winter. They were very fine. I don't think any of us realized we had such artistic talent in the Class.

Winch Heath wrote on his reply card for the dinner: "Please discontinue these notices for the present. I am going South for an indefinite period, putting all furniture in storage and having no address except that of my daughter, Ensign Barbara L. Heath, 22 Concord Avenue, Cambridge, Mass. I will get in touch with you from time to time until I return." Judging from the winter weather experienced to date, Winch showed good judgment.

Congratulations are in order for Art Skillings, as you will note from the following item in the Boston *Herald*: "Infantidings: To Lt. Armas N. Allen, USMS, and Mrs. Allen (Phyllis Bell Skillings) of Allston, twin daughters, Judith Bell and Carol Joyce, Nov. 15, at Massachusetts Memorial Hospital. Grandparents are Mr. and Mrs. Arthur E. Skillings of Allston and Mr. and Mrs. Otto Nestor Allen of Abo, Finland."

Cookie, our Class Agent on the Alumni Fund, reports as follows: "The 1944-1945 Alumni Fund closes on March 31 and old 1908 didn't do so badly after all. The way the Fund is set up there are two goals: a quota for the number of men contributing and a quota for the amount of money contributed. Well, for the first time, we went over the top in quota of men contributing, and to date we have 103 per cent tucked away. But in amount of money, we made only 70 per cent of our quota and have no 'angels' sending in large checks to swell the amount. If anyone wants to be an angel, I'll see that he gets a good pair of wings. But, looking at it from a broad angle, I feel very grateful that in these times we were able to make such a good showing as we did. When we start the new year, 1945-1946, I shall have more to say in the way of interesting statistics." We have reached one goal; let's try to make the second.

The following notes to Cookie will be of interest; from John H. Locke: "I am taking the liberty of modifying your request that I read your letter 'with tears in my eyes' to putting the requested number of tears into my fountain pen to write the enclosed check, which is small but indicates continued interest in the idea. Let me congratulate you on getting returns from all but three — now two. I shouldn't expect so much of Tech men such as I." — From Ben Bullard: "In response to your note I am enclosing a check. It has been so long since I have been in touch with the East that I should feel lost there now. The last time I remember was during World War I

when I wanted to look over some of the new buildings, but no! the guard said Uncle Sam ruled there then, so I stayed out! It was nice to have a few words from you."

The third get-together meeting and dinner of the 1944-1945 season will be at the University Club, Trinity Place, Boston, on March 20 at six o'clock. The usual notices will be mailed early in March. Please make your plans now to come. — H. LESTON CARTER, *Secretary*, 60 Batterymarch, Boston 10, Mass.

## 1909

In reply to a query from the Secretary concerning his genealogy, Clark S. Robinson, a lieutenant colonel in the Ordnance Department, has submitted the following: "So far as I know, I am only distantly related to the Swiss Family Robinson and to the Maine Family Robinson. Our particular branch settled in Connecticut in the early days, and after the French and Indian Wars, they moved to Bennington, Vt., where they were associated with those local roughnecks, the Green Mountain Boys, during the activities of those two sterling characters, Ethan and Ira Allen. Then after the Revolution, when the grateful Republic of Vermont decided to reward said Allen heroes by giving them the Grand Isle area in Lake Champlain, my ancestors went along and settled on Robinson's Point in South Hero — which hero they meant isn't known. So your crowd must be another line. Then the Allens and the Robinsons and the Landons (yes, Alf is a cousin of mine) all intermarried, the way they do on islands. And look at the results." [See also *The Review* for December.]

Recently the Review Secretary in Cambridge has been favored by visits from two classmates. Shortly after New Year's George Wallis [See *The Review* for February], President of the Creamery Package Manufacturing Company, which has several branches and subsidiaries distributed over the United States, was visiting his subsidiaries here in the East. Mrs. Wallis was with him, and they stopped to visit their daughters, Frances Sandford and Elizabeth Dodge, who live in Wayland and Wenham, Mass. After having lunch, which an engagement unfortunately prevented Mrs. Wallis from attending, we paid a visit to Johnny Davis, II, whom George had not seen for some time, and then we went to see Henry Spencer, II, general manager of the Blanchard Machine Company. George's company had just purchased one of Henry's large surface grinders and was surprised to learn from Henry the many types of work that the machine can perform. It developed that George should also have purchased a demagnetizer to go with the machine, and a sale was as good as made during our visit. In the Blanchard grinders the work is held for the most part by a magnetic chuck, and if not demagnetized afterward the work picks up iron filings and chips in a disconcerting manner, but this effect is eliminated by the demagnetizer. We had always associated Henry's grinders with heavy-duty work such as large castings, for instance, of automobile-engine cylinder blocks. Much to our surprise, Henry showed us some very small total-reflecting prisms used by Uncle Sam for delicate optical instruments being accurately ground to

smooth surfaces by smaller types of grinders. One photograph showed 1,100 of these little prisms mounted on a single plate for grinding, and they looked like those little cubes dy, dx, and dz on a side, which we used to study in our differential and integral calculus. These grinders handle even the very small quartz crystals which maintain radio oscillators at constant frequency. Henry states that in writing specifications for optical prisms the government makes it practically mandatory to use one of these Blanchard grinders.

George's visit was followed shortly by one from Delos Haynes. Delos, VI, who is a patent attorney, has several clients here in the East, and Mrs. Haynes accompanied him on this particular trip. After partaking of Boston's Saturday night specialty (beans), the four of us saw Vera Zorina in *The Tempest* at the Colonial Theatre. When any of the rest of you are coming this way, don't fail to look us up. — Recent articles by Tom Desmond include "The Balmville Tree," which appeared in the November number of *American Forests*, and "Your Town versus Tooth Decay" in the December number of the magazine *Read*. Tom is serving as chairman of the New York State Joint Legislative Committee on Nutrition.

In the September number of the *General Electric Review* there appeared a paper, "Color-Temperature Scale," by W. E. Forsythe and E. Q. Adams. The paper gave an exhaustive treatment of methods of evaluating incandescent temperatures by brightness and color, with particular reference to the use of tungsten lamp filaments for determining furnace temperatures. The paper was concluded in the October number. Elliot Adams is connected with the lamp department of the General Electric Company at Nela Park, Cleveland. The authors' photos appeared at the beginning of the paper, and aside from a slightly higher forehead, Elliot has scarcely changed in appearance. To judge from publications that have appeared from time to time describing his work, he has made several notable contributions to research in the field of high temperatures, radiation, and incandescent lamps.

Many of us remember Francis Soderstrom, III, who was formerly with the Phelps Dodge Corporation at Bisbee, Ariz., but has recently moved to Phoenix. He was a member of Company B, the company which did not always "march to drill with the proper thrill." Evidently the name of Major Wheeler has escaped him, for he writes as follows: "Your letter of December 27, with its allusion to military drill at the old Armory on Irvington Street, brought back a smile. You have a good memory indeed. I had forgotten all about Captain Dolke; I do remember the Major (although not his name) and how we used to hide under the wooden ramparts with him hobbling after us. Too bad we didn't realize or appreciate the value of military training then."

"As to myself, there isn't much to write home about. Two years ago I tried to enlist in the Coast Guard but was informed, a month after I had passed my physical, that I was put in Class S, which meant for limited service only, and that there was no authority to complete my enlistment — another case of the 'old run-around.' However, I then severed my relations with

the Phelps Dodge Corporation in Bisbee and came to Phoenix to live. This so-called Valley of the Sun gets hot in summer and not too cold in winter; when the temperature does get down to freezing with a little frost on the ground, it feels *cold*, but not like Boston. I am too old to put up with the eastern winters so have decided to spend the coming years out here where the sun does warm the cockles of your heart, or something. I am the last branch or twig of this family tree and may be withering a little bit, but that is to be expected. Being in Class S, I am not working steadily but only when the spirit moves me, which isn't often. I haven't seen any of the old bunch except T. G. Chapman, who is one of the professors at the University of Arizona at Tucson. Back in 1918 when I was a 'shavetail,' I did meet John Willard; I wonder whether he remembers it. Time still marches on, but what changes it will bring remain to be seen. The year 1909 was very good at that — but why reminisce, since that is one of the signs of old age? I had better sign off here, with best regards to you and the others."

In The Review of last April it was mentioned that Paul had an amusing anecdote of a family on the Maine coast which would appear in a subsequent issue. At long last we make good this promise and submit the story, which has to do with the same young Stanley Dodge of whom we heard another incident in the December Review. Paul begins: "This might be called the 'Tale of a Seagoing Busman and His Holiday.' The scene is laid on that noble Maine coast that Chet and I like so much. The perfect vacation for me is to go to the Isle au Haut, and I have always kept in touch with the Dodges with whom I stayed 20 years ago. They are, in fact, among the very choicest of my many friends. Well, young Stanley was drafted in the fall of 1942. Since every boy on every Maine island owns an outmoded car of some sort, and every man fishes for lobsters from a motorboat, all the men, young and old, are excellent mechanics. Young Stanley Dodge is better than most; in fact they call on him if they get stuck on a repair job. So when they classified him at Camp Devens, they assigned him to the Air Forces as a mechanic and sent him to Atlantic City for his basic training. Hardly had he arrived there when, within a matter of hours, he was in the hospital that was formerly the Haddon Hall Hotel with what proved to be one of the most virulent types of pneumonia. So sick was he that they sent word of his condition to his family on the Isle.

"My telephone rang one Thursday night with a long-distance call. A faint feminine voice said, 'This is Julia. We are in Ellsworth, taking the train for Boston. We'll be in Boston tomorrow morning on our way to Atlantic City. The Army has notified us that Stanley is very sick, and we're going down to see him. We expect to fly from Boston to New York and will call you in the morning.' Julia, of course, was young Stanley's mother. She and her husband, for the first time in their lives, were spending a night in a Pullman, taking a trip in a plane, seeing New York and Atlantic City. Happily, they found their son on the up-and-up! His fever was down. After a week end with young Stanley, they were ready to get back to the Isle and the

job there, the job being to ferry the mail across Merchant's Row and Deer Isle Thoroughfare to Isle au Haut under a contract with the post-office authorities. They were to return from Atlantic City on Tuesday morning, and I was to meet them in the Pennsylvania Station, where I had put them on the Atlantic City train the Friday before. But I did rather better than that. I met the train in Newark and surprised them, as we started across the Jersey meadows. Their minds were tremendously relieved, of course, by the good news of Stanley's condition. Yet when I asked them what they were planning to do, they insisted that they wanted to take the first train for Maine. Mr. Dodge felt it his duty to get back to that boat he operates. I tried to show them how they'd just sit in waiting rooms in Boston or Portland. There would be no train east of Portland until the next morning, and they could as well go on the *State of Maine* express at nine that evening. I urged them to stay with me in New York and see some of the sights. I particularly wanted to show them the terrace on the 86th floor of the Empire State and point out the very spot where, on his first trip about eight years before, young Stanley had implored me to show him the stairs and let him walk down from the 86th to the ground floor of the building!

"Mr. Dodge finally weakened and said, 'All right, we'll stay with you and go on the *State of Maine*.' Here's a couple who have spent all their lives on a remote island off the coast of Maine and made their living by running a mail boat now taking their first trip to New York and Atlantic City, with all that that would mean to two people who kept well abreast of the times. They knew about Radio City and the Empire State; they had accounts with the department stores; and any mechanical thing like the subways or the elevated or even the escalators and the high-speed elevators would certainly appeal to them. Yet when I said, 'Now we have eight hours at our disposal. You know quite a bit about New York. What, particularly, would you like to do?' they both chorused, as if they'd rehearsed it: 'Could we go down to Staten Island on the ferry?' They went to Staten Island on the ferry, you may rest assured!" — PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 3860 Rodman Street, Northwest, Washington 16, D.C.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

## 1910

Class notes for this month are rather light, possibly because I have had no time to pry answers to letters I might have written. My duties have been changed from those of chief of the renegotiation section, to those of the management unit of the real estate section, of the New England Division Engineers, and the change requires a complete study of new methods of procedure.

H. E. Beebe, when he made his contribution to the Alumni Fund, submitted the following: "Quite a bit of water has gone over the dam since I saw you at your Boston office. In August, 1943, I decided to get

into more direct defense work, and as my mother had passed away in the preceding April, I did not feel obliged to stay in South Dakota in the small town of Ipswich where I had resided and worked so many years. By the way, after seeing you and staying at Briar Neck for a week, so that the children could say they had lived on the ocean, we took pictures of the sign at Ipswich, Mass., both towns having been named after Ipswich, England.

"The Lockheed personnel fitted me into weight engineering on the P-38's, and it was a surprise to me (and probably to Lockheed) that after a vacation of 30 years from engineering, four months of work put me in charge of checking the changes in design and deciding whether they justified computing the change in weight. In February of 1944 the manager of a firm making the pilots' enclosures for the B-24's which your boy navigates had some trouble with material control which took about six weeks to get running. Now I have charge of all stores and materials, including steel for masts, rudders, and stacks for troopships. It seems as if the training at Technology, with a postgraduate course in dust storms, had given me something that works in the industrial world in spite of my lack of knowledge and experience. I appreciate greatly the forbearance and tact of my superiors, who have overlooked shortcomings while getting me in gear, and I am glad that in this war I can help more directly than in the last one. I am most certainly trusting that there will be a combination of power in this world that by keeping the welfare of the common people in mind will avert these foolish conflicts."

John M. Gray was elected president of the Massachusetts State Association of Architects at its annual meeting in January. — HERBERT S. CLEVERDON, *Secretary*, 117 Grant Avenue, Newton Center 59, Mass.

## 1911

Santa Claus was good to me this year and then three days later — zowie! — word came that our Class Vice-president had contributed 2½ grand to the Alumni Fund, which slightly more than doubled what 141 of us had previously given and gave to 1911 the highest class total in money and, save for two other classes (1894 and 1896), the biggest excess over quota! We were just on the threshold of a \$5000 total in the December 31 Fund totals. We'll be past that, I believe, by the time these notes reach you.

To top off his generous gift, Zeke arranged a class luncheon in my honor on Wednesday, January 10, while I was in Big Town for the convention of the National Retail Dry Goods Association, absorbing the latest in retail trade developments. Present at the luncheon to greet me were Royal Barton, VI, Phil Caldwell, I, Dick Gould, XI, Larry Odell, XIV, Selly Seligman, III, our President, Don Stevens, II, Harry Tisdale, V, and our host, Zeke Williams, XI. It was the first time in 20 years or more that I had seen good old Larry Odell — father of nine children, all of them living — and he is now with the Otto Gerda Company, exporters and importers, at 82 Wall Street, New York 5. Zeke had messages of regret from Jim Campbell, I, Bob Haslam, X, Joe Harrington, VI, and Rufe Zimmerman, IX.



A fine time was had by all, and during the assembly period in the cocktail lounge the talk naturally turned to Lieutenant General Kenney, II. Don asked whether we remembered his first citation, published from coast to coast by the Associated Press early in our sophomore year under the headline "Eats 30 Eggs in 22 Minutes," thus amplified: "Tech Student, on Wager with Classmate, Devours 2½ Dozen Scrambled at Better Than One-a-Minute Rate — Thirty golden scrambled eggs eagerly devoured by the stop watch was the record set up in the Technology Union last night by George Churchill Kenney of Brookline, who was eating on a bet with a classmate."

On the day of the New York luncheon, I was invited out to Ridgewood to spend the night with Don and Lois Stevens. After dinner Don suggested we go down to his rumpus room, which is literally lined with Brookline High School, Technology, and post-Technology pictures, trophies, and mementoes — you can imagine the reminiscence that ensued — and then back upstairs for some musical retrospect, Don's mother, who is with them in the winter, joining us in the old-time songs, Tech and otherwise. We even resurrected that verse of Don's topical song in the "Technique" for 1911, which went: "You hear about the Union fire and read with blinking eyes / Of Kenney's eating 30 eggs to win a little prize; / How Glazier pantless came through town we hardly can surmise / For the very simple reason that the style is out of season!" The next morning Don showed me the flourishing Paterson National Bank, of which he is a director, and then took me on a personally conducted tour of the Paterson plant of The Okonite-Callender Cable Company, of which Don is vice-president and works manager — the other two plants being in Passaic and Wilkes-Barre. It was an eye opener to me to see the advances in the cable industry since mid-1923, when I left it to spend five years at the Institute as Alumni Secretary. Some of the things now accomplished in the war effort by special cables are unbelievable. Before Don and I left the house that morning, I telephoned C. R. Johnson, X, and we had a nice chat. He is now with Ridleo Laboratories in Paterson and lives at 531 North Monroe Street, Ridgewood, N.J. Don said he had noted by the Phi Beta Epsilon *News* that Dick Ranger, VIII, is now overseas — a lieutenant colonel in the Signal Corps.

Thanks to Charlie Locke '96, genial Alumni Secretary, we learn a bit more of the late Jack McAllen's career after World War I in this paragraph from an obituary in the *Arizona Mining Journal*: "Late in 1919 he returned to Alaska, but later went to Portland, Oregon, with the Warren Construction Company, and then became manager of a mining property in Mexico. Returning to Alaska in 1923, he was manager of the Willow Creek mines at Wasilla until 1930. In that year he went to Seattle where he engaged at the Cliff mines at Valdez, the Fern property at Wasilla, the Lucky Shot in the Willow Creek district, and the Gilpatrick mine at Moose Pass. In 1940 he joined the faculty of the University of Alaska."

Congratulations to Hal Robinson, I, for a new honor shown by this extract from

a special order: "By direction of the President announcement is made of the appointment of Harold L. Robinson, a major in the Air Corps, as commanding officer of Army Air Field, Pocatello, Idaho, effective January 1."

Another fine bit of news came in a pre-Christmas letter from Paul Kellogg, IX, of Stevenson and Kellogg, Ltd., management engineers, Montreal, P.Q., Canada, which unfortunately reached me just too late for inclusion in last month's notes. "Last October 27," writes Paul, "I again became a benedict and married at that time Mrs. Elizabeth Watson. I have now settled down again to what to me is the only satisfactory method of living, that is, with a partner. My son, Leonard, a radio technician in the United States Navy, is at present in Hawaii. He has not yet seen action. My daughter, with her three children, has so far escaped any direct connection with the war, but you never can tell, the way things are going these days. I'm glad to see you back in the Chamber of Commerce, and we certainly hope to see you in 1946. If you come up this way before that time, be sure to drop in."

Here is more romantic news, involving 1911 juniors, married on successive days in early January. At Philadelphia, Pa., on January 5, Major and Mrs. Yereance, I, announced the marriage of their daughter, Jean Grivel, a lieutenant, junior grade, in the Coast Guard Reserve, to Nicholas Robert Zapple, also a lieutenant, junior grade, in the same branch of the service. At Brookline, Mass., on January 6, Mr. and Mrs. Haines, II, announced the marriage of their daughter, Barbara, to Philip Ellsworth Bauldry, a lieutenant in the Marines. Speaking of Brookline, Gordon Glazier's talented daughters are in the news again, for the Boston *Herald* of January 15, under the headline, "Dorothy Glazier Outskates Sister For N. E. Crown," informs us: "Dorothy Glazier, 21-year-old student nurse, won the 1945 New England Senior Ladies' Figure Skating Championship yesterday at The Skating Club of Boston, defeating her 15-year-old sister, Leslie Gardner, for top honors in a three-day competition featuring nearly 50 skaters. The home-club sister team placed ahead of 17-year-old Patty Foley of the Commonwealth Figure Skating Club. The new champion, a shareholder in the National Junior Dance and Fair championships for 1944, scored 1071 points in the school and free skating against 977 for her sister, Leslie, and 953 for Miss Foley." ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

### 1913

Larry Hart keeps digging to reach our quota in the Alumni Fund. Here's a thoughtful paragraph from a letter of H. R. Wemple, X, to Larry: "There is hardly a graduate who must not attribute at least a part of his present success to the education he received while at Technology. There should be no resting on our oars about the curriculum at the Institute and the training received there by students. A great many other technical schools are developing rapidly, and their graduates are doing big things throughout the world. If anything,

therefore, can be done toward arousing our Alumni to an appreciation of what they have already received and making them realize that contributions are needed for present and future activities, then we can maintain a strong school and one that we may always be proud of." Dave Nason, XIV, writes in the same connection: "Tech men are insulated by training from the need of being prodded by high-pressure methods to make them respond. They are trained to think logically and in an orderly fashion, putting first things first. And one of the first things, certainly, is that Technology continue to be nationally recognized as first in engineering and science. Let us all share in the pleasure of maintaining the Institute where she belongs, with additional satisfaction coming to those who do more, in order to assist those who can ill afford to do so much." Don't wait for another letter or subscription blank, just write a check to the Alumni Fund, and mail it to M.I.T., Cambridge.

It was considerate of H. B. Richmond, the 1914 Class Secretary, to write the following: "I had the pleasure last evening in Washington of having dinner with General and Mrs. Waitt (1914). Alden had just returned from a very extensive trip in the Pacific, and, while calling on General Blaimie at Melbourne, he inquired about Lionel H. Lemaire, who, Alden knew, was in the Australian army. Much to Alden's surprise and delight, he found that Lemaire was in General Blaimie's headquarters, and he immediately got in contact with him and later had dinner with him and Mrs. Lemaire. Lemaire is a colonel and is at the head of what we should call the inspector general's department, which makes him the chief inspector of the Australian army. Lemaire's daughter was graduated from the local university last June and was the first woman graduated with an engineering degree. His son is in the Australian army." I recall a letter from Lammie in August, 1914. He had recently returned to Melbourne, from a long business trip in the bush country; he had found out that war had been declared and enlisted that very afternoon. He was wounded, though not seriously, in the Dardanelles. You will recall that Lammie was at one time editor of *The Tech*. His undergraduate friends remember him vividly as having the exceptional qualities which go to make a man's man. Another British Empire classmate, Bill Young, II, has felt the force of both wars. Bill was in one of the first Canadian regiments to fight in France and was wounded. His parents sailed on the *Lusitania* to visit him as a convalescent in England and were lost when that ship was sunk by the Germans. Bill is now a major general and has lost one of his two sons in the invasion of Europe last summer.

It is with sorrow that I have to write of the passing of two classmates, last summer — F. H. Pendleton, V, on June 19, and Lindsey Whitehead, I, on July 15. Ferd died suddenly from a cerebral hemorrhage. Mrs. Pendleton wrote: "The Class of 1913 always meant a great deal to him." The circumstances connected with Lindsey's passing are so revealing of his character that I have gotten permission of his daughter (Grace Whitehead Koch) to quote from her letter: "Dad hadn't been well for almost a year before his death, but he never

complained or fussed about anything. His first thought was for his family, and he didn't want any of us to have anything to worry about. We didn't realize how very ill he was until the beginning of July, when he went to the hospital. He had carcinoma of the colon and had three major operations during his nine days in the hospital. This condition must have been going on for quite a while, and even by the time he noticed anything wrong it was too late. About 10 years previously he had had undulant fever, which may have started his trouble. The surgeon said that even if he had had an operation when he first noticed he was ill, he might have lived for several months but no longer. There must have been many times in the past year when he suffered quite a bit. I know he went through much in the hospital. But he never complained, and although he knew he had only a chance in a thousand to live, he didn't tell any of us. Before he went to the hospital, he had all his personal affairs in order, even to leaving on his dresser everything mother should have, including the name and address of his attorney on top of the books. He was very close to all of us and at times more like a big brother than a father. There are five of us children — one boy who went across to France just before Dad's death and four girls. My youngest sister and I are living with Mother." This letter has much significance for those Course I men who really knew Lindsey for the prince at heart which he certainly was.

Larry Hart is in ecstasy over the arrival of his first grandchild, a 7¼-pound boy, on December 18. His daughter Bunny and the baby are doing splendidly. Larry and Mrs. Hart were particularly happy to become grandparents at the Christmas season. Bunny's husband is on the Western Front, with the Engineers. Bill Brewster, II, has just been nominated as a term member of the M.I.T. Corporation. We are fortunate to have Bill's ability to offer to this body. Al Katz, XI, visited me recently. He is very happy in his marriage four years ago to a lady from Czechoslovakia, a refugee and former newspaperwoman. She has a young son whose hobby is chemistry, and Al hopes that when he grows up the lad will join him in his business, Colloids, Inc. Al travels the eastern states and the Caribbean countries. He will visit Mexico City soon and hopes to see M. A. Hernandez, I, who lives there.

Address changes: Vernon G. Kay, Gracmere Hotel, Chicago, from Cleveland; Dr. A. W. Kenney, McKee's Hill, Wilmington 284, Del., from Boston; Colonel H. L. Nickerson, II, Southwestern Gas and Electric Company, Box 1106, Shreveport, La., from Camp Chaffee, Ark.; W. A. Bryant, I, 1046½ Wateree Street, Kingsport, Tenn., from Roslindale, Mass. — FREDERICK D. MURDOCK, *Secretary*, Murdock Webbing Company, Box 788, Pawtucket, R.I.

#### 1914

Charlie Fiske writes that Jim Holmes of Los Angeles was in New York recently and had lunch with him. Jim, who is one of the partners of the engineering firm of Holmes and Narver, has been very busy during the war, and his company now employs about 400 people, which is nearly 10 times the ordinary peacetime strength. Practically all the work has been associated with war

projects. Charlie has also sent along the information that one of our class bankers, Les Snow, was elected a vice-president of the Chase National Bank of New York on January 10. — In spite of the greatly expanded activities at his plant, Don Douglas still has time for outside activities. He has recently been elected chairman of the board of governors of the Aeronautical Chamber of Commerce.

Ray Dinsmore, who is the head of the research and development department of the Goodyear Tire and Rubber Company, has predicted that the rubber shortage will last until 1948. He estimates that in that year the demand will be over a million and one-half tons, and it is expected that in that year the supply will just exceed this figure. A considerable portion of this demand will be for the replacement of items worn out during the war period. In 1942, our first year at war, rubber consumption was cut to just under 400,000 tons. — Probably because of the fact that a large number of patent applications in the electronics field has been placed in secrecy during the war period, we have not heard so frequently from our telephone friends in the way of new patents. It is noted, however, that Herman Affel has been granted another patent on his already long list. This one covers a vibrating relay modulator circuit.

Your Secretary has recently sent out to classmates a few letters resulting from reported address changes but so far has had no replies. These class notes can be pretty thin unless members of the Class will send in an item or two. — H. B. RICHMOND, *Secretary*, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York 19, N.Y.

#### 1916

This is a rather belated acknowledgment of the election of Lauriston E. Knowlton of Providence to the chairmanship of the technical section of the American Gas Association. The election took place last fall, but it has only recently been brought to your Secretary's attention. Knowlton was one of the members of our Class who obtained his degree during the time that the Harvard Engineering School was combined with Technology.

Harold F. Dodge has broken into print with a technical book entitled *Sampling Inspection Tables*, of which he is co-author with Harry G. Romig. The book is published by John Wiley and Sons, Inc., New York 16, N.Y., and sells for \$3.50. We hope this publicity will help its sale.

Henry B. Shepard has been elected our class representative to the Alumni Association for a period of five years. Henry is back in Newton Upper Falls, Mass., with Stowe-Woodward, Inc., having resigned from active service in the Navy last fall. Henry writes that he heard from Dave Patten recently in a letter dated September 16 and mailed from New Guinea. Classmates may remember that Dave was sent out to the southwest Pacific to serve on General MacArthur's staff. Let's hope he will be back in this country for our reunion in June, 1946, and that we can swap yarns with him at the Oyster Harbors Club on Cape Cod.

Isidore Richmond, our classmate and architect from Boston, now is a lieutenant

commander, in the Naval Reserve. His present address is Naval Air Facility, Navy No. 335, Fleet Post Office, New York, N.Y. I judge he has a tropical assignment for his Christmas card to me was in the shape of one of his own sketches of a tropical camp. — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Berke-Moore Company, Inc., 11 Boylston Street, Brookline 46, Mass.

#### 1917

Lewis W. Douglas, President of the Mutual Life Insurance Company, is a newly elected director of the General Motors Corporation. In 1933 he resigned as representative to Congress from Arizona to become director of the Budget. A year and a half later he left that post to join American Cyanamid as vice-president and director. In 1938 he was made principal and vice-chancellor of McGill University in Montreal, going from there to fill his present post with Mutual Life. From March, 1942, until March, 1943, he was a deputy administrator of the War Shipping Administration. While on the subject of directors, we observed in the daily prints of January that Penn Brooks had extended his own list and joined the Erie board.

William L. Dennen, a colonel in the Coast Artillery Corps, who is at the headquarters of the South Pacific Base Command, wrote Professor Locke '96 in December that he had just returned from an interesting trip to New Zealand, where he had met officials in charge of the Arbitration Court and of the Meteorological Service. He talked with two professors who were contemporaries of President MacLaurin and was given an excellent opportunity to broaden his knowledge of geology and physiography, as a geologist from Victoria University accompanied him on the various flying side trips taken during his visit.

Linwood Noyes, now serving his second term as president of the American Newspaper Publishers Association, is spending two or three days each month in Washington and New York. His home is at Ironwood, Mich. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

#### 1918

If no one sends me news, I cannot have any for you. These past months have been empty so far as items reaching me are concerned.

From Professor Locke '96 I receive a letter saying that Samuel Rubin, an Army colonel, wishes to transfer his membership from the Class of 1920 to our Class to be with the boys with whom he did the most of his undergraduate work. Sam's letter to Professor Locke reads: "I have a very interesting position here as superintendent of the water division and am responsible for the shipping of vast quantities of cargo to our overseas bases. It may interest you to know that since I have been in the Army, approximately 25 years covering a period of two wars, I have spent approximately 90 per cent of my time in command of waterborne activities. For 19 years I was in command of mine layers, a job which the Coast Artillery did in peacetime; and for the balance of my period of service I have



been in charge of water transportation activities within the continental limits of the United States and at overseas bases. I had a fine position as director of transportation in the south Pacific covering air transportation as well — very interesting work which took me right into the heart of the combat zone. The whole subject, particularly transportation by water, fascinates me and promises a wonderful future for young men after the war. One aspect which I believe should be more stressed in our scholastic system, as it took me some time to master, is the human element, in the form of labor relations. I've run across a great many Tech men all over the world, as I have visited in my travels every continent and all the large cities and ports of the world several times. We have always had a great deal of fun talking over the good old days and more than once sang the 'Stein Song,' as in days of yore. Reunions such as these make life worth living and give one faith in the future of society."

Don Merrill and his wife have a new daughter born on November 21. — An item from a *Science News Letter* of May 6, 1944, has just come to my notice which reads: "Penicillin may be an effective remedy for typhus fever, dreaded war and famine plague, and spotted fever. This possibility is seen by Dr. Donald Greiff and Dr. Henry Pinkerton of St. Louis University." Many of us can remember Pinkerton as a member of our Class. — Announcement has reached me of the formation of Sanger-Funnell, Inc. This organization is to take over and carry on the industrial and trade advertising service started in 1933 and carried on personally by Alan B. Sanger. Best of luck to you, Pete, in your expanded connection.

There are a few changes in military rank to be reported: Robert Gifford has the title of commander; Jimmy Flint has been promoted from commander to captain; John Steere is now a lieutenant colonel; Julian Leonard is promoted from captain to major; Joseph Roy is now a lieutenant commander; and Vincent Harriman is now a captain. — If the members of the Class will send me news, I will do my best to keep these notes flowing. — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

## 1919

Your Secretary has seen Don Way, Will Langille, Karl Rodgers, Fred Given, Leo Kelley, George McCarten, and Adolf Muller during this month. Progress can be reported on the 25-year book, and it is hoped that you will have a copy of it shortly after this issue of class notes is released. Some financial assistance will be required, and, since many of the Class have offered their help, it is suggested that checks be mailed to your Secretary with an average donation of approximately \$10. — Hy Selya has sent in his snapshots taken at the reunion in Norwich, some of which are very good and will no doubt be included in our 25-year book. Hy writes: "I have been thinking of you often and recall how pleasant our reunion was. You should have had these prints months ago, but between my family and my business the proverbial one-armed paper hanger has nothing on me. Best regards to all the boys and every good wish to you and the gang for the new year." — Chuck Drew writes from 200 Hawthorne

Road, Interlachen Park, Hopkins, Minn.: "From all reports, those of us who failed to get to the reunion missed a fine time. I am hoping for better luck when the next reunion is held."

R. F. Cashin, E. F. Seifert, and B. H. Sherman have attended recent Technology Club of Chicago group meetings, while A. H. Blake, L. J. Grayson, and E. M. Kenison have attended the Washington Society of the M.I.T. gatherings. Fred P. Baker was elected vice-president of the Rocky Mountain Technology Club in Denver, Colo. for the current year. — A private communication from H. E. Lobdell '17, Dean of Students, carried the information that Jack Fleckenstein won top honors at the American Philatelic Convention last summer. — Edward Adams Richardson of 1102 Linden Street, Bethlehem, Pa., writes that he has become engaged to Mary Elizabeth Wilbur whom he plans to marry in May.

E. M. Kenison, of 1436 Chapin Street, Northwest, Washington, D.C. writes: "As an engineer in the Bureau of Power, Federal Power Commission, I have been kept pretty busy for nearly three years. Located in Washington, one gets an over-all picture of the general power situation at present and plans for the postwar period." — Howard McClintic, a commander in the Naval Reserve, at the Cleveland, Ohio, Office of Procurement and Material, 1724 Union Commerce Building, writes: "I have been in Cleveland since June, 1943. We try to help by locating material, machinery, new contractors, additional subcontractors, and so on, for the Navy." — Reginald S. Hunt, M.D., of 10 Bonmar Circle, Auburndale 66, Mass., writes: "Since the Navy (in 1942) told me I was an old man and that my teeth were too few, I decided that I would stay home. The Procurement and Assignment Board also have listed me as essential in my work as Chief of the anesthesia department at the Newton Hospital. We are so busy at the hospital that I see no one except patients and doctors. Men of 1919 beware!"

Horace Ford's letter of acknowledgment of the Class of 1919 Series E bonds stated, "This total of \$4,425, being the 25-year gift of the Class of 1919 to the Institute, is a handsome presentation, and you are to be congratulated for your part in securing the results." — Laurence A. Gillett has moved from River Forest, Ill., to the new address of Federal Works Agency, 101 Park Avenue, New York 17, N.Y. — George B. Hirsch, 175 Benefit Street, Providence 3, R.I., has been heard from. — Max Knobel's new address is 677 Beacon Street, Boston 15, Mass. — Adolf Muller has been practicing architecture at 286 Fifth Avenue, New York City, specializing in bank buildings in New York State. Adolf has been doing some of the art work for our 25-year book, and those who recall famous "Otto" of *Whoop-Go-oo* and *Voo Doo* will soon learn that Otto has not lost his touch. — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York, N.Y. ALAN G. RICHARDS, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

## 1920

It is with regret that I pass along the news of Charles J. Muller's death on No-

vember 16 in Pittsburgh after a brief illness. He was employed by the United States Steel Corporation. I have also received word of the death of Richard E. Herczel in Chicago on March 13, 1942, but have no further information.

Lyman P. Whitten has been assigned to command the Air Service Command in the Mediterranean Theater. General Whitten left us in 1917 to begin his career as a private in the aviation section of the Signal Corps, winding up as a brigadier general in 1942. His home is at Chevy Chase, Md.

Carleton Alexander is now in Euclid, Ohio, at 1455 Sulzer Avenue. Charles D. Carleton, a lieutenant colonel, has left Fort Leavenworth and is at Fort Bragg, N.C. Major A. H. Castor's present address is Headquarters, 38th Service Group, A.P.O. 520, care of Postmaster, New York City. Mal Lees is now living in Ridgewood, N.J., at 224 Heights Road. We'd like a little more information, Mal. I. N. Zavarine has returned from Cleveland and is living in Belmont, at 62 Orchard Street. Livingston Wright has moved from White Plains to Marshfield Hills, Mass.

I regret that at this writing I am unable to give you definite news of the 25th reunion. We expect to have a meeting of the reunion committee within a few days but the choice of a suitable reunion place, in view of travel difficulties, has prevented us from completing our plans. You may be sure that you will be informed via The Review as soon as possible. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

## 1921

Curtiss T. Gardner, I, answered our inquiry about his change in address by return mail and merits our grateful thanks. Curt, who has been with the Liberty Mutual Insurance Company for the last 18 years, says in part: "I left the employ of the Liberty Mutual last June to become a freelance writer, mainly for the pulp mystery and detective magazines. I plan to spend every summer at a small place I have at Lake of Bays, Ontario, and my winters at Fort Myers, Fla. My post-office address — Tice, Fla. — is that of a small town at the Fort Myers city line which is more convenient than the main post office. When I left the Liberty, I had been general sales service manager in Baltimore for the previous three years, a job which virtually consisted of running the branch office. I wrote a novel last summer, but it is not yet placed with a publisher. I expect to write another because I prefer the longer length to short stories. The next item of mine to appear on the stands will be in the April-June issue of *Five Novels Magazine*, which should be out early in March." Curt and Mrs. Gardner, the former Mildred Smalling of Nashville, Tenn., won membership in the Bardes-Conant-Hawes-Pelkus-Waterman-Zoller family group with the arrival of Curtiss T. Gardner, 2d, a year ago. Nancy Gardner is now almost 17.

Howard L. Vickery, XIII-A, vice-chairman of the United States Maritime Commission, continues in the news for his driving efforts to maintain the high rate of merchant vessel production. Now a vice admiral of the United States Navy, Howard is the first of the Class to reach this rank. — Walter C. Sadler, I, has resigned his duties

as professor of civil engineering at the University of Michigan to join the Army as a lieutenant colonel. Walter has moved his home from Ann Arbor to 1437 Laird Avenue, Salt Lake City, Utah. — John A. Scott, VI-A, has received his discharge, after about two years in Army Ordnance, and is back at his home in Schenectady and his job with General Electric.

Herbert B. Loper, I, recently promoted to brigadier general, is the 17th general on the class records. With the two naval flag officers, almost 14 per cent of the 140 men in service are top-ranking officers. — Ray St. Laurent notifies us that the Class has sent a gift of \$25 to the Alumni Athletic Fund. He also reports that Robert M. Felsenthal, X, is manager of the radio and phonograph application section of the Radio Corporation of America at Camden, N.J. — Larcom Randall, VI, is chairman of the Alumni Association committee on assemblies, which ran the recent mid-winter Boston alumni smoker.

The month's address changes for civilians are: Mrs. Malcolm B. Lees, IV, 224 Heights Road, Ridgewood, N.J.; Wallace T. Adams, I, 2606 Flemming Road, Middletown, Ohio; Karl Jetter, I, Hotel Keen, Omaha, Neb.; Harold H. Lockey, XV, 5 Winter Street, Easthampton, Mass.; Dorothy R. Pierce, VII, 157 Hobart Street, Utica 3, N.Y.; Harry M. Ramsay, XV, 1370 Hampton Road, Grosse Pointe Woods, Mich. — Where's that news note you were going to complete and mail to Cac? — **RAYMOND A. ST. LAURENT**, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. **CAROLE A. CLARKE**, *Assistant Secretary*, Federal Telephone and Radio Corporation, 591 Broad Street, Newark 1, N.J.

## 1923

I commend to your attention the honors which have come to two members of the Class who are on the Institute Faculty: John Burchard, as director of libraries, and Bernie Proctor, as director of the new division of Food Technology. Both of these events have been covered in recent issues of *The Review*, but are mentioned here for the sake of record in the class notes. Besides, that is all I have to write about this time, as you have been unusually sparing with your fountain pens and typewriters these last few months.

I know many of the Class are in the services or in important war work about which they are not free to talk. After all, the services have public relations officers. I suggest your asking them to dust around their files and see whether they have not released something about you, or the unit to which you are assigned, which could be sent in for the edification of your friends, the readers of these columns. — **HORATIO L. BOND**, *Secretary*, 457 Washington Street, Braintree 84, Mass. **JOHN M. KECK**, *Assistant Secretary*, 207 Bloomfield Avenue, Bloomfield, N.J.

## 1925

Since the Christmas mail congestion and clerical difficulties prevented inclusion in the February Review of the notes submitted for that issue, they are inserted here, before proceeding with the March notes. The following news really should have been distributed over the first four issues of the volume, instead of being concentrated in

this one. Your Secretary was unable, however, to assemble the material earlier and is presenting it now. Please accept his apologies.

It is my sad duty to report that there have been three deaths among our membership. I should like to extend my condolences, and those of the Class, to the relatives and friends of these men, two of whom have died in the line of duty while in the armed forces of the United States. Roger W. Parkinson, II, a lieutenant colonel in the Army, was killed in action on September 26. No further information is available at present. Roger's home at the time of his death was 22 Lotus Road, New Rochelle, N.Y. — Emil H. M. Lehnhardt, who was with the Shell Development Company of Emeryville, Calif., at the time of his death, died on October 31, 1943. In his case, also, no details are available, as my only information is a notice from the Alumni Office.

Francis W. McGinnis, a lieutenant in the Naval Reserve, frequently reported in these pages, was killed in a plane crash on November 24, 1943, while en route to Casas Grandes, Mexico, on an official mission with a geologist, E. M. Stanton of Chicago, who was also killed. The disappearance remained a mystery until last August 5, when the wrecked plane and the bodies of Frank and his passenger were found by a hunter and reported. Frank's body was sent to California for burial, which took place on September 30 in the Golden Gate National Military Park in San Francisco. The cause of the accident is unknown. Frank is survived by his wife, Ursula (Regan), and two children, Frank and William, as well as by his mother, his sister, and his brother. The information concerning the discovery of the wrecked plane, and of the place and time of burial, were contained in clippings kindly sent in by his sister, Mrs. H. Arthur Peters of McKenzie, Tenn.

Ted Mitcham, a major in the Army, returned his 1944 Alumni Day reservation card with the following note: "I am in the hospital, just back from overseas. Best luck to the Class." We trust that Ted has long since recovered from the illness or injury that sent him to the hospital and that he has been able to resume his duties. A notice dated July 13 of an address change to "Edgewood," Katonah, N.Y., makes it seem likely that he has returned to his home. — A clipping from the Cincinnati, Ohio, *Products Finishing* announces the appointment, in May, of Avery Stanton, XV, as technical engineering consultant for the Magnus Chemical Company, Inc., of Garwood, N.J. Prior to serving with the War Production Board in Washington, Avery was a sales engineer with the Mason-Neilan Regulator Company of Boston, as manager of pulp and paper mill sales.

I have received the following memorandum from Charles E. Locke '96: "My classmate, Irving S. Merrell, writes me that his son Seward of your Class is now port steward for Pan American Airways at Belém, Brazil. Seward has been with the Pan American Airways for more than a year and likes the work, so that there is a possibility that he may stay on with them after the war." Until the time of this change, Seward, who was a student in Course XV, was connected with the Tucker Hardware Company, Inc., of Skaneateles, N.Y. Professor

Locke also sent a brief note, dated August 5, to the effect that James G. Creveling has left the employ of the Compañía Minera Asarco to become associated with the Tennessee Coal, Iron, and Railroad Company in Bessemer, Ala., and another concerning Merida Crum, who is in the citrus fruit business with his father at Bartow, Fla., as previously announced in these notes.

The following paragraph is quoted from a letter from Edward L. Bateman, father of Glen Bateman, X: "In regard to the service information you ask for, your card does not cover Glen's service, as he is with the South African Air Force and has been since December, 1939. His rank is now that of lieutenant colonel, and at present he is the South African Air Force representative on the planning section of the Mediterranean Allied Coastal Air Force, Central Mediterranean Forces." — From the New York *Herald Tribune* of May 7, comes an announcement of the wedding of Hoyt S. Griffith, XV, to Mrs. Toulmin Williams, the former Frances Biddle Toulmin of Haverford, Pa. Hoyt was a widower and has a son, Hoyt S. Griffith, Jr., from his first marriage. — The Dallas, Texas, *News* of June 11 reports the engagement of Max M. Sandfield, IV, of Dallas, to Carol Wiener, daughter of Mr. and Mrs. Eli Wiener of that city. The wedding was announced for July 9. — An announcement of the November 11 wedding of John C. Culbertson, XV, appeared in the Chicago *Times* for October 14. The bride is Doris Wall, formerly of North Hollywood, Calif.

At the time of writing no definite plans have been made concerning our 20th reunion. No doubt it would be wise not to plan for too extensive a celebration of this event under wartime conditions. Nevertheless, I believe that we should do our best to get at least a small group together. Alumni Day has been announced for Saturday, June 23, with the Alumni Banquet at the Hotel Statler in the evening and participation in the Class Day exercises of the graduating class in the afternoon. Professor Locke, as secretary of the Alumni Association, wishes to be informed of our plans, and an expression of opinion would be welcomed. Write to your Secretary, your Assistant Secretary, or to Tom Price, Class President (Richard P. Price, R.F.D. 1, Erie, Pa.).

The foregoing items compose the February notes; the regular March notes follow. Plans are already under way for our 20th reunion. Tom Price, our President, of the Hammermill Paper Company, Erie, Pa., will appoint a committee authorized to select a location and take care of the details. While we can't expect a large gathering in this year of wartime activity and travel difficulties, every effort will be made to provide an interesting and congenial occasion for those able to get there. The date, to be announced later, both through these notes and, probably, by direct mail, is expected to be sometime in June. If any of you men can arrange to get vacation time in the early summer, please wait for this announcement before setting the date.

A few months ago your Secretary had a pleasant surprise. While unpacking a barrel of old china which had been in storage for a number of years, I came upon a few pages from the Boston *Herald* of Sunday, June 28,



1925. Among the feature articles was a three-quarter-page spread of an interview with Arthur K. Sun, a member of our Class, and well known during our undergraduate days as a member and captain of the soccer team, as well as a participant in numerous other activities of a less strenuous and more constructive sort. Although obviously impossible to quote from such a lengthy interview, it is interesting to note that even that many years ago intelligent Chinese were wide awake to the danger of Japanese aggression. Much of the space is taken by an account of the student rebellion of 1920, brought about by certain concessions of the current government to Japanese demands, and resulting, after the arrest of numerous students (among them Arthur) and several strikes, in the resignation of the foreign minister, and the cancellation of the more onerous of the concessions. In the course of the interview Arthur told the reporter that Americans were welcome in China and that they would be quite safe in visiting the country as most Chinese knew that Americans were their friends; he spoke also of the part the United States had played, especially in the disarmament conference of 1922, in reducing Japan's grip in their country. My last record of Arthur's address, entered several years ago, gives it as Shanghai. We all hope that he has escaped harm in the warfare that has been sweeping over his native country for so many years.

As might be expected in times like these, especially among a group of men whose training makes their work so valuable in the service of their country, graduates of our Class have moved about more than at any other time during my service as secretary. I have received in the past 14 months over 190 notices from the Register of Former Students at the Institute, mostly changes of address, although many of them record promotions in the military service. The address of many individuals, especially Army and Navy officers, has been changed two or three times during that period, although the wartime system of sending mail through Army and Fleet post offices has undoubtedly held these changes down to a minimum. It is probably unnecessary to refer to the promotions on which graduates are kept informed through a special section in *The Review*. A brief list, however, will serve to highlight the part our Class is playing in the armed forces of our country. In the Navy the following promotions have been made: of Malcolm F. Schoeffel, XVI, to the rank of rear admiral; of John E. Ostrander, Jr., II, George F. Chapline, XVI, and William W. Hastings, XIII, to that of captain; of William F. Arnold, XV, and J. Merriam Lynch, X, to the rank of commander; and of Findlay G. Cameron, VI, and Virgil F. Halliburton, II, to that of lieutenant commander. In the Army, Walter F. Kraus, XVI, is now a brigadier general, and the following men have been promoted to the rank of colonel: Ralph F. Gow, XV, Garland T. Rowland, II, and Spencer A. Townsend, II. Carlton R. Mabley, Jr., II, and Glen L. Bateman, X, have received their lieutenant-colonelcies, Glen in the South African Air Force, as previously reported. E. Willard Gardner, IX-B, Thomas L. Howard, I, and Samuel R. Spiker, XV, have been promoted to the rank of major; Hoyt S. Baker, IX-B,

and Thomas D. Storie, X, to that of captain. The foregoing list does not include a fairly large number who have been commissioned to various ranks directly from civilian life.

These notes must close with a more sober item — report of the death on June 13 of John D. H. Kane, a captain in the Navy. As usual, no details are furnished, except for the notation that he was formerly listed as a commander. It seems likely that he died in action. — HOLLIS F. WARE, *General Secretary*, P.O. Box 52, Godfrey, Ill. F. LEROY FOSTER, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

## 1926

Two of our classmates who have distinguished themselves by applying their engineering training in the Army have recently been heard from. Bob Mattson, who has been with the Persian Gulf Command, was notified the week before Christmas that he was to get the Legion of Merit, presumably for somewhat the same reasons he was previously decorated by the Soviet Government for aiding in the transportation of goods by railroad in that area. On December 24 he was promoted from the rank of lieutenant colonel to wear buzzards on his shoulders. "Never again," he declares, "will I say there isn't a Santa Claus." He continues, describing the holiday season around him in the Persian Gulf Command as "slightly confused. Today, the 25th, is observed by the British, Poles, and us, but not by the Russians. Theirs comes sometime in January, but they really go to town on New Year's. As for the Persians, by a coincidence, the 25th and 26th this year are holy days during which a lot of fanatics roam the streets beating themselves with chains and looking for the assassin of Ali's son."

The second man to be heard from is Whitney Ashbridge, who is now located on an island in the south Pacific. For a period prior to going overseas, he had been engaged in building camps and other Army structures in the States. In a second letter he reported that his wife had received a copy of the 1926 "Technique" with Whitney's name inscribed on it in gold. Whitney was under the impression that this had been mailed from the Institute, but no one here seems to know anything about it, and he is at a loss to know whether it is a copy he once had and mislaid, or whether someone found a copy he never had, or just what happened.

W. B. Millar, mining geologist, continues his peregrinations, and the latest report from him indicates that he has been in the West for some time developing asbestos properties. His address is a mouthful: Box 62, Copperopolis, Calif. — Willard Edwards, a lieutenant in the Navy, now writes from the Midway Islands again with regard to the Edwards perpetual calendar. — I. Austin Kelly, 3d, was in the press recently as resigning as general agent of Fidelity Mutual Life in New York City. Austin is a life member of the Million Dollar Round Table, and, as described in an insurance journal, "He is regarded as one of the best informed men relative to pension trusts and profit-sharing plans and has addressed many gatherings on those subjects and on business insurance themes generally." — Richard W. Johnson, an

Army lieutenant, now gives his address as Sharonville Engineer Depot, Sharonville, Ohio.

In mid-January Bill Graves, Arthur Johnson, and the Secretary assembled at the Institute to provide a fitting welcome to Bull Roberts, whose runners had reported him to be on the way to Cambridge. Since his train arrived eight hours late, we were disappointed in our well-laid plans to take Bull to lunch with us, but we each had a subsequent opportunity to welcome him and to learn that he was on brief furlough from Chile but expected to go back to his mining activities there. Bill Graves is with the United States Smelting Company in Boston, and Arthur Johnson is on a special project for the Reynolds Metals Company at the Institute. It was a pleasure to get these Course III men together, and we hope it can be done again even when we don't have so good an excuse as a visit from another Course III man from far places.

Hoxie and (George) Faithfull announce the removal of their law offices from 233 Broadway to 20 Pine Street, New York City. — Returns are coming in most encouragingly from Eben Haskell's last annual request for a contribution to the Class Endowment Fund. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

## 1927

We regret to inform you that the Navy Department has announced the death of Alexander George Shisko. Lieutenant Shisko, who formerly lived in Boston, was killed in action about January 9 in the Pacific area.

Larry Cheney writes as follows from 40 Moore Avenue, Naugatuck, Conn.: "My experiences in the Army will probably be very dull reading to many of the others who have also been in the service. I went to Washington in February, 1942, and was engaged on industrial security work under the Provost Marshal General until my relief on last December 19. Not being a very active reserve officer, I entered on active duty as a first lieutenant and at my discharge had been a major for two years. I met a number of 1927 men during my tour of duty in Washington, including Dan McGrew, a colonel, and Don Horton, Chuck Smith, and Bob Deluccia, all lieutenant colonels. I made practically no trips and cannot qualify as a 'government tourist.' My work was chiefly co-ordination with all the government agencies having properties in which the War Department was interested from a security angle, including protection against sabotage and fire, safety hazards, and so forth, in order to insure continuity of production. Now I am back with the United States Rubber Company, picking up my old job where I left off. My present work is both civil and mechanical, involving design, installation, and maintenance of rubber footwear equipment, machinery, and buildings. We have quite a few major plant projects under consideration, and the prospects are that I shall be busy with a capital B."

Bob Bonnar has undertaken to organize a get-together of class members residing in the Greater New York area. As his list of names and addresses is rather out of date, those who have moved to the New York district in the past few years should call

J. R. Bonnar at Walker 5-0320, or write him in care of General Dye Stuff Corporation, 435 Hudson Street, New York 14, N.Y., or communicate with your Secretary at the address given below. — JOSEPH S. HARRIS, *General Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York, N.Y. DWIGHT C. ARNOLD, *Assistant Secretary*, Stevens-Arnold Company, Inc., 22 Elkins Street, South Boston 27, Mass.

### 1933

You may be interested in the following news release from San Francisco: "Cole A. Allen of Medford, Mass., engineering officer with Lieutenant General Walter Krueger's Sixth Army, has been promoted from the rank of major to that of lieutenant colonel. Beginning at Fort Belvoir and Fort Leonard Wood, Colonel Allen's Army career has carried him through the arctic stretches of the Alcan Highway and the jungle depths of New Guinea. Its climax to date came on a beachhead in the Philippines when he emerged unscathed from an enemy bombing attack which destroyed most of his personal possessions."

The only other news we have received this month is of the marriage of Robert Andrew Fuller, of the United States Naval Reserve, to Janet Elizabeth Swanson of Brooklyn, N.Y. Lieutenant and Mrs. Fuller expect to live in Norfolk, Va. Drop me a line, won't you? — GEORGE HENNING, JR., *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn, N.Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

### 1934

Bud Golsan wrote in to let us know how he is making out. Here is what he has to say: "Once more I have a change of address and job to report. Perhaps I should have a mimeographed form. I have been transferred by my same company (New York State Electric and Gas Corporation) from Monticello, N.Y., where I was local manager, to Mechanicville, N.Y., as a district manager. So far I can report only my company address, 214 Park Avenue, Mechanicville, as the housing situation is very tough, and I haven't been able to move my family up here. The fact that this city is in the Albany-Troy-Schenectady housing area explains the difficulty. I haven't been around long enough to look up any classmates; if, meanwhile, you learn of any whereabouts, please let me know." That is a tip for any of you fellows who are located in the capital district to look up Bud.

Here is a late news flash on Ben Malin: "Benjamin S. Malin, a captain in the Corps of Engineers, has arrived in Cairo, Egypt, from the Maintenance Division, Military Supply, in Columbus, Ohio, where he was assigned to the office of the Chief of Engineers. Captain Malin entered the service in 1941 and is now serving as mechanical engineer and supply officer in the construction division of Headquarters, United States Army Forces in the Middle East. For service prior to Pearl Harbor, Captain Malin holds the National Defense Service ribbon."

Bill Milliken was recently appointed assistant manager of the Curtiss-Wright research laboratory's newly established department of flight research in Buffalo. It is the function of the department to flight-test

new aviation products and develop improved flight-test methods and design. After graduation from the Institute, Bill attended the Boeing School of Aeronautics. Then, after working for Chance-Vought and Vought-Sikorsky Aircraft, he became in 1938 assistant chief of flight testing for Boeing Aircraft. He was flight engineer-in-charge on the first experimental flights of the Boeing B-29 Superfortress. He later joined Avion, Inc., in Los Angeles as assistant chief of flight and aerodynamics. He left this position to join the Curtiss-Wright research laboratory as assistant flight research manager. That is quite a record, Bill.

We ran into Jack Dunning recently in the Grand Central station. He has left the Corn Exchange Bank and is now working for the Fifth Avenue Bank. — ROBERT L. SMITH, a lieutenant in the Marine Corps Reserve, was married on September 2 to Ruth Hammond, daughter of Andrew G. Hammond of Danvers, Mass. The couple will live in Cherry Point, N.C.

Well, fellows, how about picking up your quills and dashing off a few quips for your Secretary? News isn't rationed, and you can use the back of an old envelope, or a penny postal card. We are not particular. — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, 169-49 24th Avenue, Flushing, N.Y.

### 1937

The recent rush of getting out new types of weapons, missiles, planes, rockets, and so forth has more or less swamped this literary department, as you may have noticed by the lack of material in previous issues. Since Dave McLellan, our prexy, has offered to help fill the breach, you may read some of his honest efforts in later issues. He is now living near the Institute, but what he is doing is not exactly clear as he didn't mention it in his letter. Perhaps he will tell you in a later issue.

Captain Walter Ballard, 309 East Aeronca Drive, Oklahoma City 10, Okla., writes: "I have long since been trying to get news to you and our fellow classmates. First, I'm the proud father of W. P. Ballard, 2d, born November 12. My job here is that of chief of the engineering section at the Oklahoma City Air Technical Service Command. This is the model air depot of the nation, employing about 15,000 people. Most of our work has been concentrated on the B-29 Superfortress. Yours-truly is using a lot of the principles instilled at the Institute in designing engine baffles, new cowl flaps, and cooling improvements. The job is very interesting, and I surely would like to see or hear from any of the old Tech friends. It makes me feel good to see our Class going over so well on the Fund, and I am looking forward to seeing more news in The Review."

I see by the papers that Jim McLean is still going strong in his television activities; also that Bob Vogeler is now manager of the Western Branch Sales Office of the Federal Telephone and Radio Corporation, and, according to my latest dope, living somewhere within the confines of La-Grange, Ill.; and, a little late but none the less true, that Dick Fowler, who is now Dr. Fowler, by virtue of his graduation from the University of Rochester medical school,

was married on September 23 to Mavis Helen Dunlop of Rochester.

Ed Olmstead has "wangled a job with Jack and Heintz" in Cleveland, Ohio. He claims that this company is "the liveliest and the least encumbered by paper work of any I have ever seen, and watching them get things done in a hurry is proving a most interesting experience." He is now living at 285 Columbus Avenue, Bedford, Ohio. The papers also tell me that Pope Lawrence, who is now a captain located in Austin, Texas, attached to the Public Health Service, was engaged on November 5 to Martha Miller of Dallas, Texas. The wedding was set for November 18, but my intelligence officers have not yet reported on this detail.

Phil Dreissigacher, now an Army captain at Camp Gordon, Ga., writes that he finds himself "very much in the rear echelon of this war at the present time as a coast artillery (antiaircraft) officer in an infantry camp — one of the many, I might add. Apparently the old foot soldier is overshadowing all else. I have spent most of my active duty in Georgia or, to localize it more completely, at Camp Stewart. I left there in October for Camp Gordon; after one week here to be converted to Infantry, I jumped back into antiaircraft for a month and a half at Mitchell Field, N.Y. This tour of temporary duty ended conveniently in a 16-day Christmas leave. While I was at home (in Mamaroneck, N.Y.), my engagement to Ruth Wilson of Mamaroneck was announced. We have made no plans for the wedding because of my return to Camp Gordon, where I am an adjutant of a training battalion. I haven't run into anyone from Technology since leaving Stewart but have met a high proportion of officers whose acquaintance was made back in the Reserve Officers' Training Corps at Fort Monroe. Best of luck, Windy, and remember me to any classmates you see regularly."

Thanks, Phil, and all the rest of you fellows — see you in the next issue, we hope! — WINTHROP A. JOHNS, *General Secretary*, 34 Mali Drive, North Plainfield, N.J. PHILIP H. PETERS, *Assistant Secretary*, 159 Glen Road, Wellesley Farms 82, Mass.

### 1938

We are very sorry about the lack of notes in the past two issues of The Review, but they were due at the Alumni Office during the Christmas holiday season and time was a minus quantity then. We often hear comments when there is no 1938 report in The Review, but when we ask for news from classmates, that is a different story. How about letting us know what you are doing?

Gus Rossano is an exception to this plea. Each year, around Thanksgiving time, we get a nice letter from him telling of his year. On this last November 25, he said: "I am still with the United States Public Health Service; for that matter I shall be with them for a long time as, since 1942, I have been in the regular corps. Last June, after a pretty rugged series of written exams on public health and sanitary engineering subjects, I succeeded in earning a promotion to the rank of passed assistant sanitary engineer, which is equivalent to the Army rank of captain. At that time I was on assignment to the bureau of industrial hygiene of the California State Department of Public Health at Berkeley as industrial hy-



giene engineer. Shortly after my promotion I was assigned to the Colorado State Department of Public Health as director of the division of industrial hygiene. My duties here include organizing the new division, staffing it with scientific personnel, and acquiring the necessary office and laboratory facilities, instruments and equipment. My work is very interesting and involves safeguarding the health and well-being of the industrial workers. Our main industry is mining. Colorado mines yield many minerals essential to the war effort. Perhaps the most important single item of personal news is my prospective desertion from the ranks of celibates. After a long struggle I've finally tasted defeat at the hands of Cupid! But I confess that I yield willingly. The big event is set for next month and the place is Denver."

Another marriage was that of Jack Williams to Edythe Mathews in Milton, Mass., last October. They are now living in New York City. — On November 25 Fran Hagerty was married to Mary Connolly in Newton. We met Fran one day last fall, and he is still the same great guy. When he left the Institute he went to Cohasset, where he started a small boat shop, building mainly racing shells and single shells, some for the Technology crews. When the war came, that work dropped off, and he is now building equipment for war purposes, including some for the Radiation Laboratory at the Institute.

Sylvia and Asher Shapiro sent us a proud announcement of the birth of Peter Mark Shapiro on November 6. He was a big fellow — 8 pounds 10½ ounces. Ash reports that mother and son are both fine. He is working at the Institute and living in Arlington. He cycles to and from work, a distance of at least five miles each way.

Since our graduation several members of our Class have been back at the Institute for graduate work, research, or teaching and have lived in Room 620 of the Graduate House. One of these 620 clubbers was Fred Kolb, and he started a circular letter among the members which has just reached your Secretary. Fred and Polly Kolb are still in Rochester; he is with Eastman Kodak. Frank and Eleanor Gardner are living in Mahwah, N.J. Frank is in the metallurgical laboratory and experimental foundry of American Brake Shoe Company. He is working mostly with manganese steel and heat-resistant alloys. At the time of the letter they had one boy, Dick, but since then we have reported the arrival of a little brother. Jim Gillis writes as follows: "Since being a member of the classes of '38, '39, and '40, I have been with the Federal Shipbuilding and Dry Dock Company, Kearny, N.J. What I have contributed to the company slips my mind for the moment, and no doubt its value is being checked by the Truman committee, but I should like to report that in spite of my presence, Federal has delivered 144 ships to the value of more than 500 million bucks since Pearl Harbor. I get paid for being assistant to the outfitting superintendent and have spent the last 15 months supposedly supervising the fitting out of a group of troop transports, which happen to be the largest ships being built in the country, except for battleships, heavy and medium cruisers, and large aircraft carriers. The tubs cost only 12 million apiece."

Fred Reuter is in the lamp development laboratory of General Electric at Nela Park in Cleveland, doing a combination of research and manufacturing on some special types of neon glow lamps. Dick Muther is in the Navy as expediting officer in Hamilton, Ohio. — DALE F. MORGAN, *General Secretary*, Carbide and Carbon Chemicals Corporation, 30 East 42d Street, New York, N.Y. ALBERT O. WILSON, JR., *Assistant Secretary*, 32 Bertwell Street, Lexington 73, Mass.

#### 1940

Edgar Adams, Jr., is a project engineer with the Airborne Instruments Lab. Mr. and Mrs. Adams became parents of a son in November, 1943. Ed also writes that he recently ran into Eugene West, who is a Marine lieutenant living in Washington, D.C., at present. — Alvin Gutttag is an examiner at the Patent Office and writes that Milt Green is in the Marines and that Arnie Arch is a captain and was located in Texas, but apparently on his way overseas. Alvin saw Sam Omansky for a short while when they were both in New York City last summer. — Theodore Naidish has recently had published a novel, *Watch Out For Willie Carter* (Scribners). This novel tells of a boxer's rebellion at life and has been rather highly praised in several book reviews. One review says, "It might be a good idea to get in his corner." — Robert M. Weiss, a first lieutenant in the Corps of Engineers, recently reported for duty at Headquarters of the San Francisco Port of Embarkation, where he has been assigned to the engineering branch of the Overseas Supply Division at the San Francisco port. Lieutenant Weiss was a statistician with the American Steel and Wire Company in Cleveland before he entered military service in March, 1943. — Colonel Robert F. Seedlock is the new commanding officer of the Burma Road Engineers, now engaged in pushing through the final stretch of road to connect India supply bases with China. The colonel received his master of science degree as a member of our Class.

Bernard F. Greenberg recently had published a paper entitled *Cable Calculations for Shipboard Power and Lighting Systems*. His paper appeared in the *Journal of the American Society of Naval Engineers*. He writes that he is still employed as an electrical engineer in the Bureau of Ships, Navy Department, Washington, D.C. — Jackson R. Nichols, formerly a metallurgical assistant with the American Smelting and Refining Company, is now an ensign in the U.S. Naval Reserve. — Barry Taft is supervisor at the materials control laboratory of the Pratt and Whitney Aircraft Division. — Gary Steven is with the airplane division of the Curtiss-Wright Corporation in Buffalo, N.Y. His title is senior process engineer, but actually he is the plant metallurgist responsible for the heat treatment in a plant employing 40,000 people; he is also in charge of the metallurgical section of the materials laboratory. He works in the plant laboratory with almost every conceivable kind of engineer and has been assigned to reorganize the metallurgical section according to his own ideas with practically a free hand to buy and build equipment. He has six junior metallurgical engineers and laboratory technicians directly under his charge. Naturally he is delighted with

the position and the opportunity for valuable experience in dealing with almost every known alloy, both ferrous and non-ferrous. — Hilmi F. Sagoci has a job as computer with the National Geophysical Company in Dallas.

Among the replies to Tom Creamer's letter, W. W. Merrill, Jr., writes that he is an aerodynamicist with Lockheed Aircraft Corporation in Burbank, Calif. He says: "I am still doing aerodynamic analyses at Lockheed. Charlie Lindblom, Bob Prince, Harvey Brown, and Jackson Wignot are scattered about the engineering department of Plant B. We have had several Lockheed-M.I.T. Alumni dinner meetings since last November, 1943. There are about 40 Alumni at the two plants, A and B, ranging from the Class of 1942 back to the Class of 1906. Grant Brazier and Art McCabe, a lieutenant in the Army, journeyed over from Douglas Aircraft in Santa Monica to attend one of the meetings." — Bob McDonnell, Jr., has been working with the Waterbury Tool division of Vickers, Inc., for the past three years as an instructor in the company's training school and on the installation of the new final inspection procedure system. The company is doing work on hydraulic transmissions for ammunition hoists, elevating and training all types of guns, cranes, and steering gear. Bob says that several Tech fellows are working for the company, with whom he has weekly golf and tennis sessions, but he mentions neither the score nor the names of the fellows. — Herman L. Meyer, an Army captain, was planning to attend the Army Air Forces engineering school at Wright Field last summer. He wrote that he had flown to Milwaukee to attend the wedding of his brother, Chet Meyer '36.

George Kaneb, a process engineer with Neches Butane Products Company, when he wrote in reply to the Alumni Fund letter, was working in Texas making butadiene for synthetic rubber. — Al Wu, now an engineer with National Reconditioning Company, Inc., has bought a home in Glen Cove, N.Y., and writes that he is settling down for the duration. — Ed Wallace is a metallurgical engineer with Ulster Knife Company, Inc. He says: "My heart and home are in the highlands not far from where Rip Van Winkle took his 20-year siesta. I am among fellow metallurgists for nearly all the men in this part of the country have been blacksmiths at one time or another. They have never heard of crystal structures, phase changes, and alloying elements. But neither had I heard of their witchcraft in metallurgy. Though I will not accept responsibility for results, they claim that remarkable properties can be achieved in metals by hardening in a solution of tobacco juice, wood ashes, and vinegar. This is a sad plight for Tech men who know of no industry or concern equipped to make the tobacco juice." — Thomas E. Sullivan is senior technologist with Shell Oil Company in the Houston, Texas, refinery.

John B. Casazza, a lieutenant in the Sanitary Corps, has been fighting malaria for the Army and has been located in Panama and North Africa. — John Vanderpoel, a captain in the Army Air Forces, wrote that when he left for overseas Lieutenant Bill Kempton '39 took over his flight squadron. — Captain Doug Eckhardt has been wait-

ing patiently for a medal commemorating the battle of Boston and Harvard Square. He says that by the time this is printed he will have been living off the Army in Boston for three years. (You underestimate, Doug — make that three and a half years.) — Captain Warren Francis was working with Major Winthrop Steele '39 and has seen something of Captain O. K. Smith at the Coast Artillery School at Fort Monroe. — Arnold Smith, a lieutenant in the Navy, is now an instructor in twin-engined, land-based advance trainers. He went overseas and flew Navy B-24's in the south Pacific. He writes that he came back with a good sinus infection which required several operations, but he is back flying again. He is classified, however, as not yet physically qualified for combat work, hence is trying to teach the cadets what he knows. He expected to be in Corpus Christi for more than a year. — John P. Szumski is a supervisor with E. I. du Pont, located in Danville, Ill.

This just about completes the replies to Tommy Creamer's Alumni Fund letter. Some of the replies were so out of date by the time I got around to them that I dared not print them; others, giving simply addresses and occupations, I was forced to omit because of limited space. As for myself, I am now working with Ben C. Gerwick, Inc., contractors on a carrier pier at the Naval Air Station in Alameda, Calif. It would be most gratifying to get a few letters from you fellows, not being too modest, but telling me about what you are doing and where you've been in the past four years. — H. GARRETT WRIGHT, *General Secretary*, 1040 Lombard Street, San Francisco 9, Calif. THOMAS F. CREAMER, *Assistant Secretary*, 2032 Belmont Road, Northwest, Washington, D.C. JOHN L. DANFORTH, *Acting Assistant Secretary*, Room 24-222, M.I.T., Cambridge, Mass.

#### 1941

A few letters in our mailbag this month serve to perk things up a bit. Charlie King, writing from Cumberland, Md., where he is on temporary duty from the Chemical Warfare Service labs at the Institute, says: "About two weeks ago I saw Herb Moody, who was on leave in Boston. He was about to go overseas in charge of a ballistics unit for the Ordnance Department. He seemed to think it would be a red-hot job. I also saw Mall Abzug and Marsh McGuire in Washington. We called up Joe Gavin, who is down there in the Navy Bureau of Aeronautics. Mall and Marsh are still single and are part of a group of 10 Army and Navy officers who run a large mansion out toward Glen Echo. The dive is appropriately called 'Screwball Manor.' Joe is married and lives in Washington."

Les Corsa, writing from Harvard Med, reminds us of "Lew Jester's recently arrived daughter, Elizabeth Ann, born June 19." He says that George Clark, a major in the Signal Corps, is now beyond New Guinea and still moving. We read of the marriage of Sarah Elizabeth Knox to Frank Storm, a captain in the Army Air Forces, stationed at March Field, Riverside, Calif. Frank, as you recall, has just returned from an overseas assignment in the Ordnance Department. Joe Kleiman, a lieutenant in the Army Air Forces, a little note tells us, was recently assigned to a Flying

Fortress unit of the Fifteenth Air Force. Joe signed up in October, 1942, and received his wings in March, 1944. In New Jersey last fall, according to a news clipping, Margaret Needles became the bride of Herb Williams, a second lieutenant in the Army.

Our Class, we learn, fostered quite a celebrity, who is now assuming the post of undersecretary of national defense under the government of the Philippine Islands. Melchor headed the engineering department at the Philippine Military Academy and took graduate work at the Institute. The papers tell us of the rescue at sea of Francis Murphy, who was shot down by four Zeros and a dive bomber. Captain Murphy barely disengaged himself from his sinking plane, was sighted by two American fliers and rescued.

Ivor Collins, a lieutenant in the Naval Reserve, writes: "We were busy as the proverbial bees down there during June and July. We managed a couple of weeks up at Biak in late July as a sort of finale. Then in August my orders came through — home for 30 days' leave! I spent them in New York City and at Vassar, where my sister is a junior. I flew to San Francisco the day before Christmas and out here on the 27th. I dropped in to see Carl Aronsen's folks in the Bay City. He's fine but still in China, and a first lieutenant now, serving as meteorologist at an airfield out there. In October I also had a letter from Bill Fox. He was in better shape than when he last wrote and expecting to be at work about the first of the year. I picked up another stripe on July 1. I hope we can finish the show this year and get the gang together for that five-year reunion in 1946. Till then, the best of luck and a happy New Year to all the Class." We note that Alex Poskus is A.P.O.-ing out of San Francisco, as is Irv Koss, who was formerly at Fort Monmouth.

It is with deepest regret that we learn and pass on news of the death of two more members of our Class in this modern global war — John Heist, XV, a major in the Army, killed in action on September 2, and Richard K. Henry, Jr., II, killed in a plane crash on December 15. May we express our sincere sympathy to the parents and families of these two men, who have died in the service of their country. Our Class, too, feels their loss. — STANLEY BACKER, *General Secretary*, Philadelphia Quartermaster Depot, 2800 South 20th Street, Philadelphia 45, Pa. JOHAN M. ANDERSEN, *Assistant Secretary*, 12 Ware Street, Cambridge 38, Mass.

#### 1942

The mail is not very heavy this month although there is one item of interest requesting the honor of our presence at the marriage of Maryan Marie Tague to John J. Quinn. It also calls J. J. a lieutenant in the Army Air Forces. Now how did they ever catch up to Jack long enough to get him to walk down the aisle? By the time this gets into print, the newlyweds will have been married for a month or more. Lots of other fellows are getting themselves a ball and chain. Bob Howard writes that Norman Pinto is engaged to an Illinois girl. Further information is lacking. George Toumanoff now has a wife — the former Jane Adams of Brookline. The wedding

took place on November 14 up at the Harvard Congregational Church. Why so few weddings this month? Surely the fellows in our Class can do better.

We have recently found out that Chris Peek is working at Sylvania in Salem. If that be the case, how is it we don't see him more often? Lusty Lustwerk has seen him, but only for a fleeting moment. Meanwhile, Lusty is contemplating a trip to New York, where he hopes to join five or ten fellows whom he left down there a few months ago. Does anybody remember Art Gow? Personally, I don't see how anyone could forget him. Well, the other day when we were wandering around the halls of the Institute, we saw an Army uniform coming toward us, and who should be in it but Art Gow! It seems that he was working out at some plant in Washington, got fed up, and joined the Army. Since then, he has been making a tour of the South and claims that the moonshine they hand out down there is awful good but awful potent, too. Art hasn't changed a bit. Neither has C. L. McGinnis. A clipping arrived several weeks ago describing the plight of our former prexy, who had been forced down somewhere in the great Pacific, as somewhat serious. He claims, of course, that he ran out of gas, or some such foolishness; anyhow the Navy managed to pick him up after 24 hours of "real sea duty," and he is safe and sound back in San Francisco. We certainly should like to hear the real story behind this. — FREDERICK W. BAUMANN, JR., *General Secretary*, Orchard Lane, Golf, Ill. S. YOUNG TYREE, JR., *Assistant Secretary*, Room 2-215, M.I.T., Cambridge 39, Mass.

#### 1943

Again I must open these class notes with the saddest news possible. During the second day of the invasion of Leyte (October 20), Everett Graham, Jr., a lieutenant in the Army, was killed in action. Everett was a member of General MacArthur's staff and had been overseas since November, 1943. A few weeks before he left this country, he and the former Elizabeth Sheridan were married. We extend our very deepest sympathy to Everett's wife, family, and friends.

From the Pacific, also, we have heard that Greg Azarigan, a lieutenant in the Navy, has been awarded the Silver Star for "distinguishing himself by conspicuous gallantry and intrepidity in action. . . . At this time he was executive officer of a PT boat. . . . In broad daylight, with utter disregard for his own safety and in the face of fire from enemy gun emplacements, which he first silenced from his own boat, he swam ashore, towing a life raft, and rescued an allied officer who was himself too weak to swim out to the boat or to haul in a line shot to him by a line-throwing gun. This feat was a great inspiration to his men. His action was in keeping with the highest traditions of the Navy of the United States." Greg, commissioned an ensign in March, 1943, has been serving in PT boats in the Pacific since December of that year.

This month is an unusual one for we have practically no news of Cupid's handiwork. The only evidence, in fact, of his continued activity is the wedding of Frances Eugenie Goulding and Joseph Boyce in Boston a few weeks before Christmas. Mail has been plentiful — another reason for this month's



being an unusual one — hint? Hans Haac writes from the hospital down at Fort Benning in Georgia: "What am I doing in the hospital? Right now, I am gold-bricking, today having been pronounced a hospital holiday. I enjoy the seclusion of a private room and bath and work up at the education office for about six hours a day. This is a soldiers' paradise. We are allowed one and a half rations and a special diet — turkey, steak, roast beef, and delicacies such as shrimps and oysters. I get up at 7:30, certainly a very reasonable hour. I still limp badly but ought to be much better in a month or two. I had a light break in my ankle." Hans, that sure is a life of leisurely luxury you are leading!

Another man who, superficially at least, would seem to be having a grand time, for he writes from Virginia Beach, Va., is Charlie Holt. He says: "Don't let the hotel advertising fool you. The Manor is anything but gay these days because this is strictly the off season. The testing of naval equipment has kept me at Navy bases in Virginia for nearly three months. It may be another month before I get back to Boston. As for the draft 1-A's, I get them regularly, but so far the Institute has managed to obtain deferments."

Frantz Kreider reported on himself shortly before Christmas as follows: "Greetings, as our three months are nearly done, and I am about to leave Mississippi. The work is getting more interesting and at the same time more exacting. We can't sleep so much in class now and must study some, which goes down hard! Trying to put a radio together in lab is not much fun, but instructive. The lab equipment here, considering the courses taught, still amazes me. It would drive them green with envy up at M.I.T. This part of the South sure has disappointed me so far as the weather goes this winter. I have been slowly freezing to death for the last few weeks. I have been to New Orleans several times, and it is certainly a nice town. As you say, Canal Street

is a real main drag for any city. I hope to get to Mobile if I can get out this week end. I don't really know where I go from here, but probably to Chicago."

A note from George Musgrave tells us that he and Virgil Otto have made their operatic debut in Indianapolis. He describes it thus: "The San Carlo Opera Company came to town. Virg and I, having decided to be *supers*, went down and told them that we were such (instead of asking if we might be); so they gave us costumes, including spears and a minimum of directions. It was only after the playing of the 'Star-Spangled Banner' that they told us what we were to do at the beginning of the first scene of the first act of *Aida*! Anyhow, in the next to the last scene our job was to chase one of the characters clear across the stage, which we had a great time doing." Not being satisfied with a name in opera, George has "found time somehow to finish a book started in my sophomore year at Technology. It has been accepted by the H. W. Wilson Company and will be published in the spring. Its title is 'Competitive Debate: Rules and Strategy.' Imagine a Tech man writing a book on anything so far afield from the things he studied!"

The last letter at hand, from Dick Feingold, reads: "I've been following our class notes quite ardently since graduation and have enjoyed them all. I believe I'm long overdue in contributing what little news I have picked up. [Oh, that more of you would have these same sentiments and add to the feeble trickle of news coming my way! — Clint.] I am now with Jackson and Moreland, engineers, here in Boston, having joined the firm last July. Before that, I was with Curtiss-Wright in Louisville, Ky. I am sorry I missed many of the fellows from our Class who were at Fort Knox, Ky. I did run into Tom Bennett, an Army lieutenant; at the Derby last spring. I've seen Dick Foley and Ed McClaud quite often in my home town, Hartford. Ed became engaged to Harriet Bolles of West Hartford on De-

cember 17. He is in sales engineering at Pratt and Whitney. Foley, along with Dick Childerhose, is quite active at United Aircraft research. I have heard from P. A. Ambro and Cor Meyer, both at Grumman Aircraft on Long Island. Ambro is in the structures group, and Meyer is an experimental test pilot. Last summer he flew the F7F, then experimental, for its Navy approval. Ed Place was with this firm recently but is now in the Army Air Forces at Wright Field. Formerly he was with Brewster Aeronautical Corporation. I've heard quite frequently from Gene Eisenberg, a lieutenant, junior grade, who has run into many Tech men in the Admiralty group in the Pacific. Gene has prospered in terms of liquor by drawing portraits of his fellow officers in exchange for 'fifths.' [Oh, to be an artist! — Clint.] The latest news from Barrie Mackenzie, a sergeant in the Infantry, puts him on the West Coast, expecting to move farther west in the near future. I have seen Goose Hosley around Boston quite often. He is with the Polaroid Corporation. Goose has had news of Greg Azarian [see above] and also of Lieutenant Jim Ingham, who has been building airstrips in and about Australia."

I rode down from New York last week end with Mort Schultz, who is now stationed at Edgewood Arsenal, Md. He told me that Bill Selke is somewhere in the Pacific and that Lieutenant Russ Bowen is operating some kind of a radio in France. — I have had several requests for news of myself. Well, I am still here in the fire control branch of the Ordnance School at Aberdeen Proving Ground. There is nothing particularly spectacular about that, but by the time the next class notes are written, I shall have been married. Betty Williams of Staten Island, N.Y., will become Mrs. Clinton C. Kemp in New York on February 24. Don't expect too much of me after that! — CLINTON C. KEMP, *General Secretary*, Barrington Court, 988 Memorial Drive, Cambridge 38, Mass.

*Announcing —*

# 1945 ALUMNI DAY

*Saturday, June 23*

**Afternoon: CLASS DAY EXERCISES**

**Evening: STEIN-ON-THE-TABLE BANQUET, HOTEL STATLER**





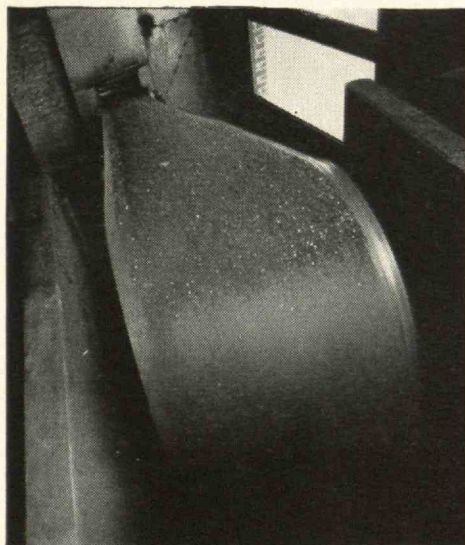
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# IN A BUTTERFLY CIRCUIT

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